OCTOBER 1913 THE 15 CENTS

RAILROAD & CURRENT MECHANICS

The Electrical Wizard of VALHALLA

See Page 36

Face Charm

The outline of the features does not in itself constitute the chief charm of a face. It is the 'something more' that is made up of expression, grace, color and complexion, that gives the true distinctive note.

The tone of the face is almost exclusively a matter of the complexion; and it is in the cult of the complexion that

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FC

Victor Record of "Celeste Aida" sung by Caruso

Caruso as Rhadames in Aida

Photo Bert, Paris

Both are Caruso

The Victor Record of Caruso's voice is just as truly Caruso as Caruso himself.

It actually *is* Caruso—his own magnificent voice, with all the wonderful power and beauty of tone that make him the greatest of all tenors.

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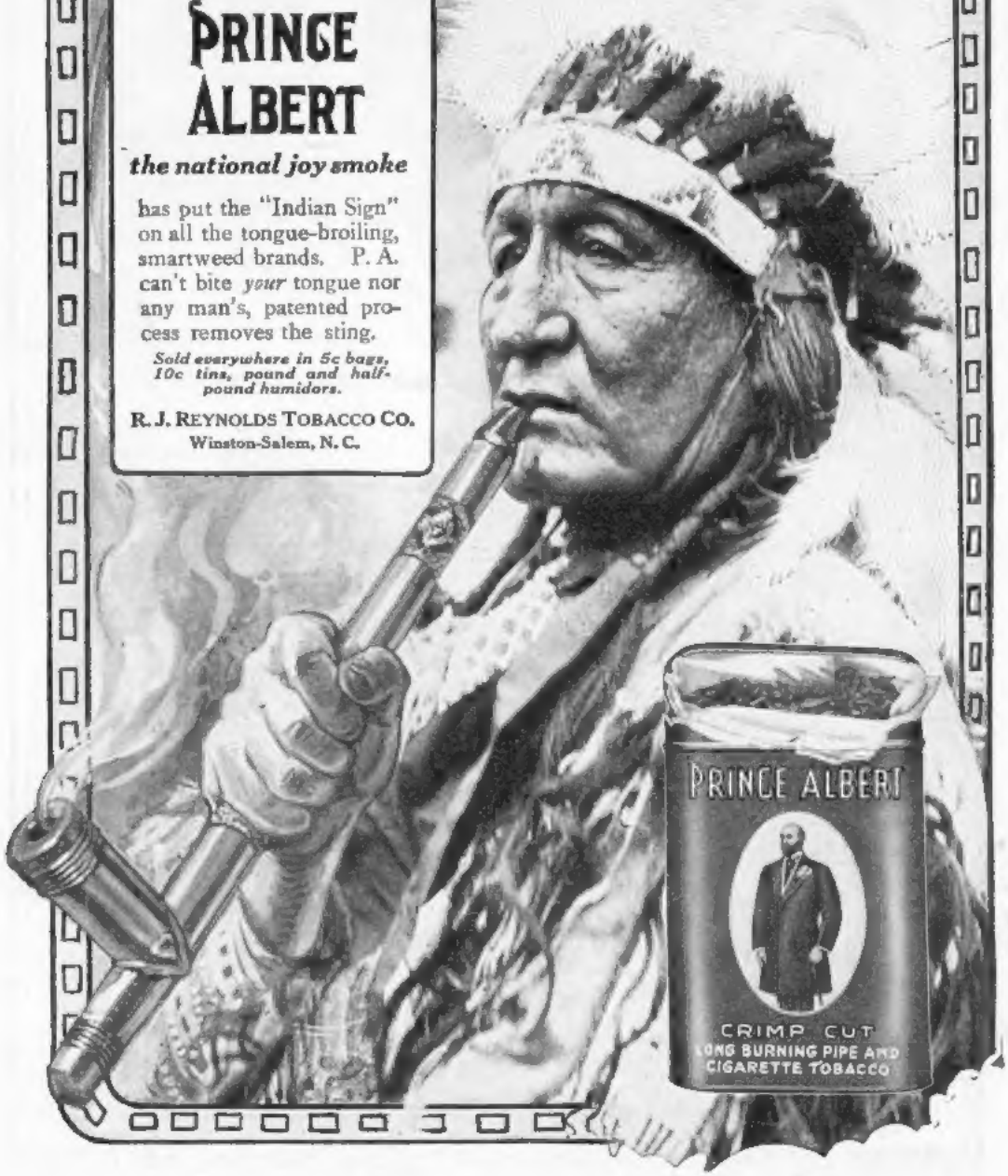

The RAILROAD and CURRENT MECHANICS

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ISSUED MONTHLY BY THE FRANK A. MUNSEY COMPANY
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How's Business With You In the Country's 7th City

Are you doing the volume of business in Baltimore to which its size, importance and **buying power** entitle you?

It has been said of Baltimore that a larger percentage of its people live on the income from solid, substantial old stock and bond investments than any other city on earth, with possibly one exception, which would seem to make clear why it is a **peculiarly stable** market—why its people apparently always have the price—and why it's well to be disposing of a considerable part of one's output in such a solid and such an **important** market.

It's well to have an anchorage in the shape of **part** of your business, so situated that it won't fall off in times of depression, isn't it? Well, **that's Baltimore.**

But, unless you are altogether and in all ways satisfied with the condition of your Baltimore affairs—and business is pretty good in Baltimore just now, thank you—we beg to present for your consideration **the way** to make that consideration better.

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The facts in the case are these: The News enters daily 61,000 out of the 78,000 white and English-speaking homes **in Baltimore**—almost as many as any other **two** papers put together—and it does this in the all important evening—and it enters as **influentially** as it does **completely.**

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Let us make an investigation for you to find out **just how great** your Baltimore possibilities are. We'll make any kind of an investigation you want, entirely without charge. We'll do practically anything you ask of us except ourselves actually sell to the trade.

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Frank D. Webb.

Advertising Manager,
The Baltimore News.

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The Purpose of this Department

is to put the reader in touch immediately with the newest needfuls for the home, office, farm, or person; to offer, or seek, an unusual business opportunity, or to suggest a service that may be performed satisfactorily through correspondence. It will pay a housewife or business man equally well to read these advertisements carefully.

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	Line Rate	
The Munsey	$2.00	Special Combination Rate $5.15 Less 3% cash discount.
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The All-Story	.75	
The Cavalier (Weekly)	.67	
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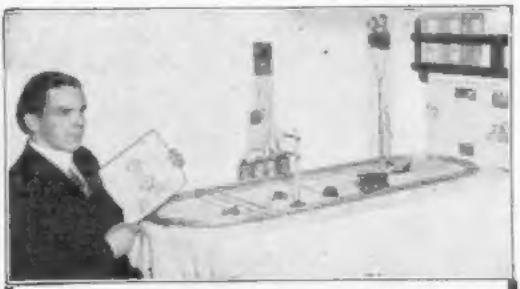

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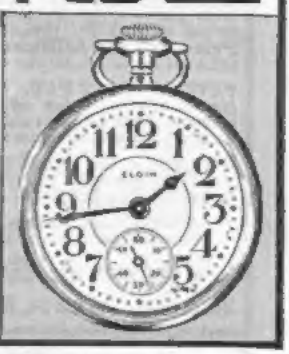

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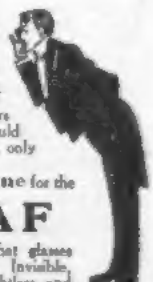

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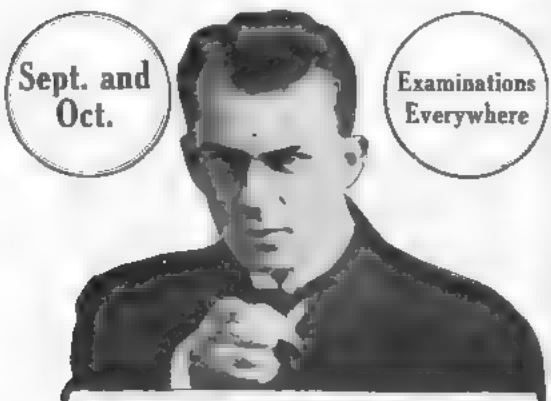

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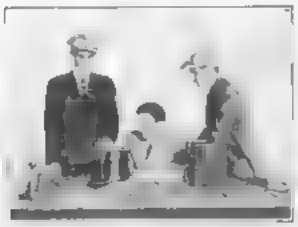

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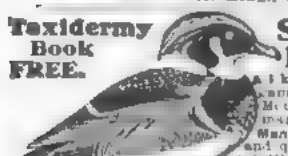

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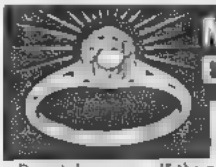

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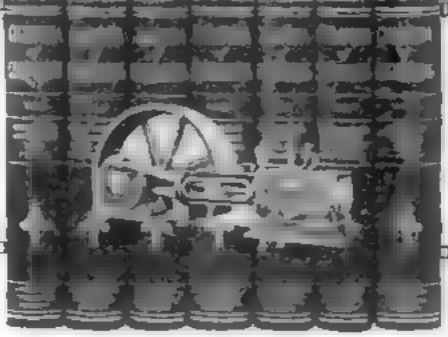

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A chance to save a third on your Clothing and the surety of absolute satisfaction.

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TRADE MARK

$20 SUIT or O'COAT made to order

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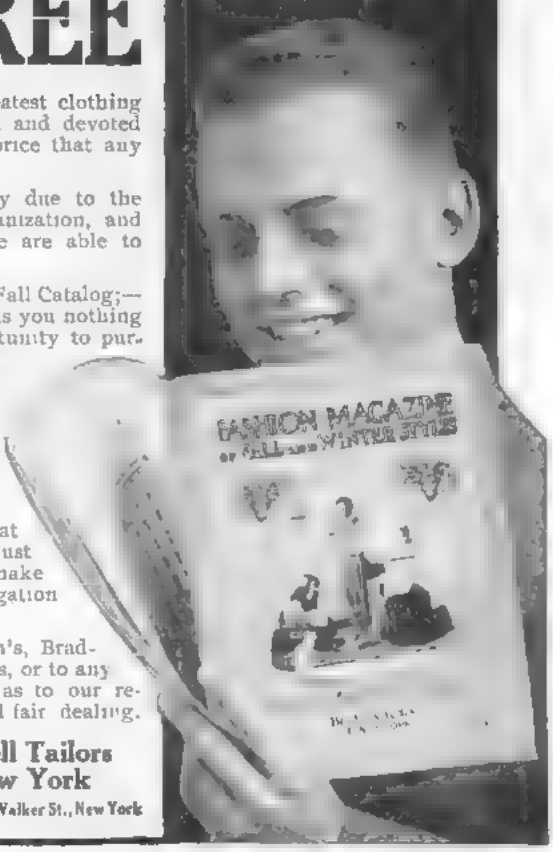

Fairy Magic—Telephone Reality

A tent large enough to shelter his vast army, yet so small that he could fold it in his hand, was the gift demanded by a certain sultan of India of his son, the prince who married the fairy Pari-Banou.

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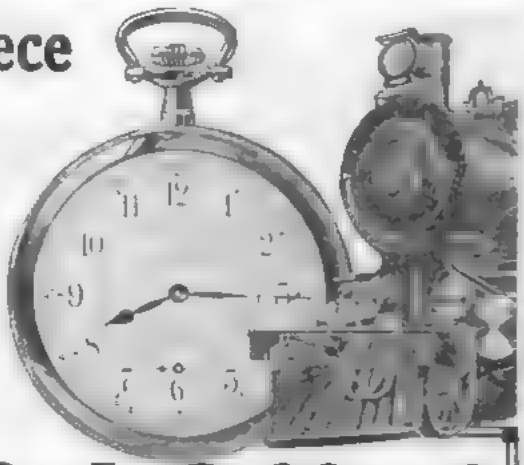
The 1913 Timepiece



The masterpiece of watch manufacture—the Burlington Special—19 jewels, adjusted to the second—adjusted to positions—adjusted to temperatures—adjusted to isochronism.

Write for The Burlington catalog illustrating the latest ideas in watch cases: *Inlay Enamel Monograms, Block and Ribbon Monograms, Diamond Set, Lodge, French Art, Dragon Designs.* Open face or hunting case, ladies' or gentlemen's 12 and 16 sizes. Furnished in any style case with your own [illegible] and the emblem of your order or any other emblem on the other side. See free catalog coupon.

Special Offer!

Read! The Superb Burlington Watch **now** at the *direct* rock-bottom price—the same price that **even the wholesale** jeweler must pay—and in order to encourage everybody to secure this watch at once, pay this rock-bottom price, either for cash or $2.50 a month on this great special offer!

Watch Book Coupon

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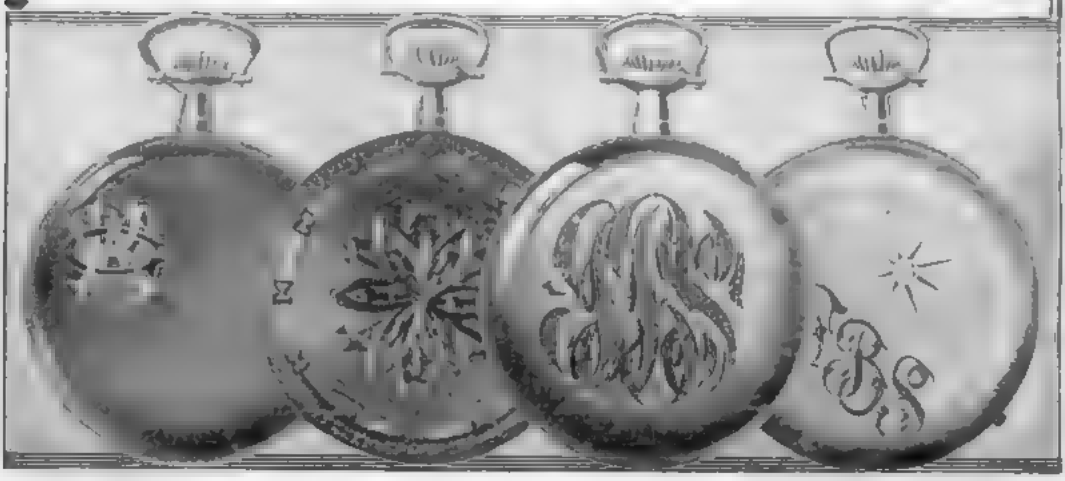


The RAILROAD and CURRENT MECHANICS

Vol. XXII. OCTOBER, 1913. No. 1.

JOHN B. SHELDON, SUPERINTENDENT OF TELEGRAPH, UNION PACIFIC RAILROAD.

THE MEN WHO MANAGE RAILROAD TELEGRAPHY.

BY THADDEUS S. DAYTON.

IN no department of railroading have there been greater changes during the last fifteen years than in that governed by the superintendent of telegraph. In none is there a wider field for advancement.

Originally the superintendent of telegraph of a railway company was con-

cerned solely with the operation and maintenance of the road's telegraph lines. Of late years, however—since electricity has come to play such an important part in railroading—his authority has been extended greatly.

In almost every large company it has been doubled or trebled. To-day, in addition to his absolute control of all telegraph matters, he is equally the master

P. W. DREW, SUPERINTENDENT OF TELEGRAPH, WISCONSIN CENTRAL, NOW THE SOO LINE

Photograph by S. L. Stern, Milwaukee

of the railroad's telephone lines. On some railways he has charge also of the signal system.

Not so very long ago the superintendent of telegraph was a minor official. His principal requirements were a knowledge of Morse and human nature. His knowledge of electricity was limited to the telegraph. He hired and fired all the operators employed on the line. On some roads the men on his pay roll included the agents and operators at the smaller stations. A superintendent of telegraph who drew three or four thousand dollars a year salary thought he was doing very well.

To-day the superintendent of telegraph is a very important official. On some large systems he ranks next to the vice-president and general manager. He has been relieved almost entirely of the employment of the small army of men whom he directs through his various heads of departments.

In addition to being a first-class operating man, who knows the science of telegraphy, he is an expert electrical engineer. He knows as much about the

J. C. JOHNSON, SUPERINTENDENT OF TELEGRAPH, PENNSYLVANIA RAILROAD

Photograph by Gutekunst, Philadelphia

telephone and signal systems as he does about the telegraph.

His salary has grown with his efficiency. To-day there are many superintendents of telegraph who draw from $5,000 to $7,500 a year salary. There are some who receive $10,000, and a few whose compensation is even greater.

On the larger lines the direction of the signal system is in charge of a separate department, with its own superintendent. Sometimes this official reports to the superintendent of telegraph and sometimes to the head of the operating department. Usually the superintendent of signals is next in the line of promotion to the superintendent of telegraph.

The superintendent of telegraph, as a

rule, is employed jointly by the railroad and by the telegraph company that has its lines along the right of-way. The most notable exception to this is a large Eastern system that has two superintendents of telegraph. The one in charge of the western section is a joint employee, but the other is responsible solely to the railroad company

Four times out of five, however, when a new superintendent of telegraph is to be selected the man chosen must be approved by both parties.

GEORGE BOYCE, SUPERINTENDENT OF TELEGRAPH, CHICAGO, ST. PAUL, MINNESOTA AND OMAHA RAILROAD

GEORGE H. STEAD, SUPERINTENDENT OF TELEGRAPH, CANADIAN NORTHERN RAILWAY

Handling the telephone end of this department, however, is wholly a railroad matter. The maintenance and operation of a railroad's telephone system is to-day a much bigger item than it used to be, and it is growing continually. At present about one-third of all the work of the office of the superintendent of telegraph relates to telephone matters

Telephone Becoming Popular.

On the trunk lines that run into New York City the use of the telephone is becoming almost universal. By the end of this year on the New York Central, for instance, there will not be more than four or five circuits that are not handled by telephone.

A circuit is usually a railroad division, but sometimes there are two circuits on one operating division. For example, on the Mohawk Division of the New York Central, which extends from Albany to Syracuse, about 148 miles, the business is too heavy for one set of despatchers, and is divided into two circuits. The dividing point is Little Falls, seventy-three miles west of Albany, but both sets of despatchers are at Albany

There are thirteen operating divisions on the New York Central and about twenty telephone despatching circuits.

"The adoption of the telephone for train despatching and other purposes has not displaced telegraph operators on our line," said A. B. Taylor, superintendent of telegraph of the New York Central. "We have never discharged a telegraph operator on account of the telephone. The telegraph wires and instruments still remain in all our signal towers. If the telephone fails at any time

W. B. SMITH, SUPERINTENDENT OF TELEGRAPH, NEW YORK, NEW HAVEN AND HARTFORD RAILROAD.

Photograph by Tilly, New Haven

the operator turns to the Morse circuit and everything goes on without an instant's delay. We have made no effort to substitute non-telegraph operators for operators, but the ability to telegraph is not so requisite now as a knowledge of railroading.

"The point about telephone despatching is that you can do more work in the same time with the telephone. A despatcher can keep his sheet up with less labor and more promptly than he can by using only the key and the Morse circuit.

"Further than that, the telephone is very convenient in other ways. Take a blockade or a wreck, for instance. The despatcher can get the conductor or the engineer on the telephone and talk directly with him. In this way he can grasp the exact situation much more quickly and completely than by working through a telegraph operator at the other end.

"A despatcher working over a telephone circuit can handle ninety miles of line with as little effort as he would exert in taking care of fifty miles with a telegraph circuit."

The efficiency of the telephone in railroad work has been greatly increased by the development of the "selector." This is an instrument that enables one office to be called without disturbing any other.

Has a Private Line.

Every office or station equipped with a telephone has a "selector," which operates over the line and rings a bell at whatever point the person operating it may designate.

The "selector" is about half the size of a cigar box. On the outside there is a little key, or indicator, similar to that on a messenger call.

When the despatcher wishes to call up a station he turns this key around. When the proper connection has been made he has a private telephone line.

It is only within the last few years that the "selector" has been perfected and adapted to railroad service. There are several makes of this instrument in successful use. Especially on despatchers' circuits, where there are forty or fifty offices, is it almost indispensable.

G. O. PERKINS, SUPERINTENDENT OF TELEGRAPH, CHICAGO AND GREAT WESTERN RAILROAD.

Photograph by Marchand, Chicago

The organization of the superintendent of telegraph's office is quite different to-day from what it was even ten years ago. The only men that he carries on his own pay-roll are likely to be some wire chiefs and some operators at the main division points.

There is a man in charge of each circuit who occupies the same relation to the men under him as the division superintendent does to his subordinates in the operating department.

The local men look after their own sections, and the superintendent of telegraph concerns himself with the big problems of the through service.

The long distance telephone service is directly in charge of the superintendent of telegraph. On the New York Central there is a telephone line to Buffalo which is connected through to Chicago. A second line to Chicago is now being run.

Railroad Pays Its Portion

There is a line between New York and Albany, and thence east to Boston, *via* the Boston and Albany Railroad. In addition to these, there are innumerable local circuits in yards, sidings, and at other places where the need for the telephone has appeared.

All these lines are constructed and maintained by the railroad company, as a rule, without being subject to any other authority.

A railroad works jointly with the telegraph company in the operation and care of telegraph lines. The gangs of station linemen who look after the maintenance of the wires, poles, and instruments are joint employees. In some cases they receive their orders only from the railroad; in others they are solely under the direction of the telegraph company's wire chiefs.

The railroad pays its proportion of the expense. In any event it is usually the telegraph company that furnishes all the material that is used

Out on the line, whether the men take their orders direct from the superintendent of telegraph or from the telegraph company's wire chief, there is usually one district foreman to every hundred miles.

These men have charge in their districts of all construction and maintenance work. Their gang foremen report directly to them. On the New York Central there are about sixteen gang foremen, each with a force of men constantly employed.

On that road the district foremen supervise all that goes on in their jurisdiction and report direct to the superintendent of telegraph. All these men are carried on the railroad pay-rolls and the distribution of the expense is audited and apportioned in the office of the superintendent of telegraph.

B. F. ROBBS, SUPERINTENDENT OF TELEGRAPH, OREGON SHORT LINE

Photograph by Fox & Symons, Salt Lake City

The same method is followed in regard to the operators. Some of these handle railroad messages only; others are employed in offices where both railroad and commercial messages are received.

There is an almost constant flood of reports from the six or seven hundred offices on the line. A great deal of correspondence is necessary to keep everything straight. It takes a large staff of clerks to look after this and to check up the reports of receipts and disbursements and figure the proportions due each company.

It will be seen, therefore, that the superintendent of telegraph is also an

CHARLES SELDEN, SUPERINTENDENT OF TELEGRAPH, BALTIMORE AND OHIO RAILROAD

E. A. CHENERY, SUPERINTENDENT OF TELEGRAPH MISSOURI PACIFIC RAILWAY

accounting officer whose responsibilities and duties are very heavy.

The superintendent of telegraph is an intermediary between the railroad and the telegraph company. He is responsible for the work that is done, no matter by whom or how it is performed. Both sides expect him to see that the service is maintained with as little interruption as possible.

Over the Combined Circuits.

The modern superintendent of telegraph has an easier time when storms beat down the line than his brother of ten or fifteen years ago. It is seldom that he deems it necessary to go out and take personal charge of restoring communication. That was one of his especial duties in former days.

When there is trouble now the local foreman connects with the chief of his district or of one of the telegraph company's wire chiefs, and the superintendent of telegraph does not get the details until it is all over if it is not of unusual magnitude. If the disaster is widespread, however, the district foremen inform him of it immediately, but he is not likely to do more than to keep in close touch with the progress of the repair work so that he can give whatever instructions may be necessary.

While the superintendent of telegraph is a joint employee, about four-fifths of his time is directly connected with railroad work. One reason for this is that the telegraph company has its system of standards and methods so completely organized that, under ordinary circumstances, a superintendent need exercise no more than a routine supervision. On the other hand, however, every railroad matter connected in any way with the telegraph or telephone service is referred to him by the railway company.

A new element has entered into the electrical end of the superintendent of telegraph's work. There are a great many combined circuits over which the telephone and the Morse work simultaneously. There will be four wires, for instance, between two points hundreds of miles apart. These will constitute three distinct telephone circuits and four Morse circuits.

To look after the complex conditions

R. R. HOBBS, SUPERINTENDENT OF TELEGRAPH, LOUISVILLE AND NASHVILLE RAILROAD.

GEORGE A. CELLAR, SUPERINTENDENT OF TELEGRAPH, PENNSYLVANIA LINES WEST OF PITTSBURGH.

arising from an installation of this sort requires a much wider knowledge of electricity than was necessary in former days.

The staff of a superintendent of telegraph now includes a number of highly trained technical men—telegraph engineers, telephone engineers, and all-around electrical engineers. Such men in the railroad service usually have risen from the operators' ranks, acquired experience in telephone work, and then added a course of technical study. In the end they become of the greatest value to the railroad.

It is the opinion of the leading superintendents of telegraph that there are better chances for operators to-day than ever before. More positions are open to those who are able to qualify.

Many positions have been created in the last ten years that never existed before simply because there was no necessity for such men.

Wire testing is important work. It requires a high order of ability and knowledge and a fair amount of experience, yet wire chiefs have great difficulty in finding men to fill the vacancies.

It is the same in almost every other line of technical work in the telegraph department. There are more positions than there are capable men to fill them.

Any operator of ordinary intelligence can qualify himself for these higher places that pay from $150 to $300 and more a month. It is simply a question of study and hard work.

Practical Courses for Students.

Electricity is a field in which much remains to be discovered. It is making greater progress than almost any other branch of science. Many colleges are splendidly equipped and offer fine courses in the various divisions of electrical science. Some of these institutions have evening classes especially for those who are employed during the day.

A recent investigation of American scientific schools was made by the Institute of Electrical Engineers of Great Britain, and they were pronounced superior to those of any other country.

Wherever practicable the railroads cooperate with these colleges, so that the students may gain a practical knowledge

W. H. POTTER, SUPERINTENDENT OF TELEGRAPH SOUTHERN RAILWAY

Photograph by Donaldson Studio, Washington, D. C.

of the application of electricity to transportation

When electrical work was an art, and not a science, the leaders among the superintendents of telegraph were mostly graduates from the university of hard knocks. The men who are moving upward to their places to-day are those who have acquired more or less scientific training and experience

A superintendent of telegraph's job became vacant on a big Western railroad. The man selected to fill it knew nothing of Morse, but he was an expert telephone and electrical engineer, and that counted more than a knowledge of dots and dashes

At present there are two roads that lead to the post of superintendent of telegraph. Many have traveled the first First an operator, then train despatcher's assistant and chief clerk in the train despatcher's office, then train despatcher, trainmaster, and superintendent of telegraph.

The other route is through the commercial telegraph offices and leads to the position of wire chief in the railroad service. This also gives one experience in the operating end of railroading. Nowadays the railroads are picking a larger number of their telegraph superintendents from their wire chiefs.

The modern superintendent of telegraph must be a first-class operating man, because so great a part of his duties overlaps that department. He must also have a thorough theoretical and practical knowledge of electricity so far as it is connected with railroad transportation

Too Valuable for the Position.

The men thus equipped do not stay long as superintendent of telegraph. They are too valuable even for that important position, and frequently their services are required higher up in the big executive places.

The young man who wishes to rise high must make up his mind to ceaseless study in connection with his every day practical work. Even a college course is less than half of an education. The rest is based on aptitude, ambition, and hard work. If a man possess only ordinary talent and has a capacity for hard, conscientious, and well directed effort,

M. MAGIFF, SUPERINTENDENT OF TELEGRAPH VERMONT CENTRAL RAILROAD

Photograph by W. D. Chandler, St. Albans, Vt.

he is sure to attract attention and win advancement. Many of the leading superintendents are excellent examples of success in this important calling.

James C. Johnson, superintendent of telegraph of the Pennsylvania Lines east of Pittsburgh, is only forty-seven years old. He received his education in the public schools of Milton, Pennsylvania, where he was reared. Later he took a course in railroad and electrical engineering. He began his railroad career as a telegraph operator on the Catawissa and Williamsport Division of the Philadelphia and Reading Railway in 1883.

J. J. ROSS, SUPERINTENDENT OF TELEGRAPH MICHIGAN CENTRAL RAILROAD

Photograph by D. D. Spellman, Detroit

WILLIAM F. WILLIAMS, SUPERINTENDENT OF TELEGRAPH, SEABOARD AIR LINE

Photograph by W. O. Hazard & Co., Portsmouth, Va.

Less than two years later he entered the service of the Pennsylvania as operator on the Schuylkill Division. He was promoted to train despatcher in 1887, assistant trainmaster in 1903, and division operator and assistant trainmaster in 1905. He became chief clerk to the superintendent of telegraph in 1907 and advanced to the post of superintendent of telegraph in January, 1910.

A. B. Taylor, superintendent of telegraph of the New York Central, began as an operator for the Western Union. He studied shorthand, and his first railroad experience was acquired as a stenographer. The West Shore Railroad was being built in those days and he was offered a place with the superintendent of construction at Schenectady, New York. When that work was completed he returned to New York City and secured a position with the general superintendent of the West Shore at Weehawken, New Jersey.

Soon after he was transferred to the general manager's office. There he remained for twelve years. His chief was J. D. Layng, one of the great masters of railroading. His next step was superintendent of telegraph of the West Shore. Later he was promoted to the same position on the New York Central.

Charles Selden, superintendent of telegraph and general inspector of transportation, Cincinnati, Hamilton and Dayton system of the Baltimore and Ohio, began his railroad career in 1866 on the Cincinnati and Indianapolis Junction Railroad, now a part of the C., H. and D., as an operator.

Later he was clerk in the shops, then a train despatcher. In 1868 he left the railroad service and entered the employ of the Western Union Telegraph Company at Cincinnati. In 1879 he resigned

from that company to operate the Bell Telephone Exchange at Toledo, Ohio, at the same time serving as superintendent of the American Union Company.

He returned to the railroad service in 1881, becoming superintendent of telegraph of the Wabash Railroad System. In 1884 he became superintendent of telegraph of the Baltimore and Ohio. Since that time he has been chairman of the operating rules committee. Last year he was made general inspector of transportation.

Mr. Selden was the organizer of the Association of Railway Telegraph Superintendents, which now numbers about two hundred and fifty members. He drafted its constitution in 1881. He is an authority on the telegraph, telephone, and electrical affairs connected with railroading.

On the B. and O. Mr. Selden has under his direction all employees engaged in construction, reconstruction, and maintenance of telegraph and telephone lines and equipment. On the B. and O. the public or commercial business of the telegraph company is a distinct department, also in charge of the superintendent of telegraph.

AMERICANS HAVE PERFECTED THE LOCOMOTIVE.

ANSWERING a question asked by a Pittsburgh engineer relative to the comparative achievements of American and English inventors in locomotive designing, it must be admitted that George Stephenson, an Englishman, built the first locomotive, but: the high pressure, high speed engine itself, so simple and efficient, is the invention of Oliver Evans, an American; the multitubular boiler, so essential to rapid steam-making, and without which no train could be kept running at a rate of more than ten miles an hour, was invented by Nathan Read, an American; it, in turn, is carried in compact form by four-coupled driving wheels and four-wheel truck, a combination invented by John B. Jervis, an American, while the driving wheels themselves, of cast iron, made hollow, are the invention of Thomas Rogers, a Jerseyman, who, also, was among the first to use weights secured in the wheels to counterbalance the reciprocating parts.

Allen paper wheels—a thoroughly Yankee notion, the invention of Richard Allen, an American—carry the engine truck, says the Pittsburgh *Post*, while the tender is sustained by cast iron wheels with chilled tread, invented by Ross Winans, of Baltimore, and the single bar frame holding cylinders placed horizontally and bolted together in the center is another combination designed in part by Winans and perfected by William Mason, of Taunton, Massachusetts. Moreover, all the pipes and joint connections are secured against leakage by the ground joint, invented by M. W. Baldwin, of Philadelphia, while expansion braces, designed by Thomas Rogers, already referred to, give the fire-box a secure hold on the frame, yet permit the boiler to lengthen or shorten, as change of temperature requires.

Continuing the list, the weight of the engine is distributed evenly to the axleboxes by means of equalizing levers, invented by Joseph Harrison, a Philadelphian, while two fixed eccentrics, invented by William James, of New York, give movement to an Allen side-valve, balanced by a device, invented by George Richardson, an American, who also devised the pop safety valve, the most perfect device known for relieving boiler pressure. The slide valves are operated by Baker-Pilliod motion, an American invention, and are oiled by a Detroit lubricator. Spark-throwing is restrained by an extended smoke-box combination, invented by E. M. Reed, once general manager of the New Haven system, and combustion is promoted and smoke-making prevented by a specially designed fire-box constructed of mild steel made in Pittsburgh by the Baldwin Locomotive Works of Philadelphia, the enginemen all the while sitting comfortably in a convenient cab, first designed by David Matthews, an American, but since improved by many builders.

And last, while the locomotive thunders along the steel highway at high speed over chasms spanned by traceries of steel and down steep mountain grades, the engineer sits calm and steadfast, secure in the knowledge that locomotive and train are entirely in hand since a turn of a lever will cause every wheel to be gripped by viselike brake-shoes applied by the greatest life-saver of modern times, the Westinghouse automatic air-brake

FIFTY YEARS WITHOUT A "CALL."

Alexander Larkin, Erie's Oldest Hogger, Is Retired on a Pension After Half a Century of Service Unmarred by a Serious Accident.

BY A. H. DREHER.

FIFTY years an engineer and never called "on the carpet" is the record of Alexander Larkin, of Cleveland, Ohio, oldest engineer on the Erie Railroad, who was retired with pension last April.

Mr. Larkin entered the service of the Erie in February, 1862. Two months later he was promoted to engineer. He reached the age limit of seventy years last January, but declined to take advantage of the pension to which he was entitled until he received his "order" to quit work. The order for his retirement was received on Thursday, April 17, but, agreeable to his desire it was withheld until the end of the week, April 19, when he ran his engine into the roundhouse for the last time, bade the "old girl" a fond farewell, and went home to his other girl—a sweet-faced, silver-haired woman who has been his wife for nearly half a century.

ALEXANDER LARKIN.

Two years ago when he went to the roundhouse to get his engine, which had just been turned out of the shops, Mr. Larkin found "Alex. Larkin" on the cab window in place of the old number, 2517. It was a tribute to his faithful and faultless service.

One Run In—with a Pig.

During the half century that he controlled the locomotive, Larkin had only one run in. It was with a pig. The dispute over the right of way between the pig and a string of cars attached to Larkin's engine resulted in a draw. It was a fight to the finish, and both principals in the one-round affair were knocked out.

It was shortly after the construction of the Hubbard branch of the Erie, between Youngstown and Hubbard, Engineer Larkin was backing a string of cars when he killed the hog. The engine and cars, derailed on the soft ground of the newly constructed roadbed, toppled over, and Mr. Larkin was laid up for two months with a broken arm and a dislocated elbow.

"Success in railroading is merely a matter of obeying orders," said Mr. Larkin, after being ready to receive orders and to know how to carry out instructions.

"An incident early in my career taught me the folly of taking a chance. I left Mahville one cold winter night with right of track over everything except one train, the first section of which we met and passed at Berghill. We had orders to meet the second section at Cortland. It was down grade approaching Cortland, and I had a clear view. I saw the headlight of the train on the siding, and was glad that we would not have to wait.

"We passed the train, but something seemed to tell me all was not right. I stopped my train just beyond the passing track. A moment later a headlight appeared at the curve less than a mile ahead. It was the second section—the one we had orders to meet and which we had every reason to believe we had passed.

"The train on the siding was an 'extra' that had been running ahead of the first section, but had to put in at Cortland because they had no time against us.

"It pays to be careful, but both carelessness and carefulness are costly, for nowadays a three-minute delay is considered more serious than a delay of fifteen minutes a few years ago.

"In this connection the most trying thing an engineer has to contend with in this age of speed is trespassers. People walk the tracks in front of speeding trains utterly unmindful of their danger. Their carelessness is nerve-racking to the engineer who is required to keep a schedule that allows no stops or slackening of speed.

"There was a young fellow who started to work as night operator at Solon, Ohio, years ago. He looked much like any of the other telegraphers, only a little less so, perhaps, for he was a little fellow. That young man, Grant W. Taylor, was always asking questions and looking for information. And it never was necessary for us to tie down our whistles to awaken him to clear his signal. He looked me up the other day when he was in the city. He's general superintendent of transportation of the Southern Railway Company now."

President McKinley's last trip from Cleveland to Pittsburgh was on Engineer Larkin's train. President Garfield frequently was a passenger when journeying between Washington and his home near Cleveland. But of greater moment, in Mr. Larkin's estimation, was the occasion of "Billy" Whitla's return to his parents in Sharon, Pennsylvania, on his train, after ten thousand dollars ransom had been turned over to his kidnapers, who afterward were captured and taken to the Western Pennsylvania penitentiary by the same train.

When Alexander Larkin entered the employ of the Erie Railroad, "double" tracks were of a different style than those of to-day. The line between Cleveland and Youngstown was double track the present standard gage tracks being laid inside of the old broad-gage. Cars for both gages were hauled.

"Cars were of the four-wheel style in those days," said Larkin, "and weren't very large, but still not small enough for a person to pick one up and walk away with it, so when we arrived at Youngstown one night with one of the 'narrow gage' cars missing from our train, we didn't know what to make of it.

"The mystery was solved the following day by a barber at Warren, who found the car in his tonsorial parlor. I remembered then that our train had parted at Warren I gave the signal, and the brakeman went back and coupled the two sections together, not knowing that one of the 'dinky' cars had jumped the track and run down the embankment to spend the night in the barber-shop."

Mr. Larkin's first engine weighed twelve tons. The last, the one bearing his name, one hundred and twenty tons.

TOWN ILLUMINATED BY HEADLIGHT.

"I HAD been on the road for a Kansas City house six years before they finally extended my territory to take in the Oklahoma Panhandle. I thought I was a seasoned traveler until I took my first trip down there."

Here the drummer rang for the porter and asked him to bring a new supply of matches.

"Smoke up, boys; these are on the house," he continued. "The first town I made across the line from Liberal was Guymon. I had spent the afternoon there and intended to take a night train back to Liberal. A bunch of us were sitting on the front porch of the Commercial Hotel, playing cards, when I saw a headlight looming up down the track. I made a rush for my grips and yelled to the boy to get his cart and take 'em over to the depot quick.

"'How's this,' I said to the agent, 'I thought this train was not due for an hour, and here she is not a mile away.'

"'Mister,' he replied, 'you better go back to the hotel and buy cigars for that bunch. This is your first trip down here, isn't it? Well, I thought so. That headlight is just forty-nine miles away; you've got pretty near an hour to finish that game of pinochle. This is the longest straight and level track in the country—one hundred and seventy-six miles, clear across the Panhandle without a curve or a hill. You see that house over there? That's where I live. I don't have to have a light in a lamp until after nine o'clock winter nights. About sundown the Golden State Limited looms up down about Texoma, and she shines right into my kitchen window for an hour, finally getting so bright that my wife has to pull down the curtains. It's a great saving, and my wife has gotten so she won't wash dishes by anything but electric light, and the young folks play croquet in my yard by the light. When an extra comes along after the two passengers they can play until late bedtime. I never have to call the despatcher to get the time on trains. I climb to the roof of the station, get a line on the headlight occasionally, and mark up my board accordingly. Have you any baggage to check?'"
—Moberly, Missouri, *Monitor*.

UNCLE SAM'S MAP-MAKER.

For Twenty Years Robert Bradford Marshall Has Been Putting Places on the Map and Acting as the Official Guide for the Inhabitants of a Vast Nation.

BY ENOS A. MILLS.

IN the office of the United States Geological Survey in Washington is a mild-mannered gentleman who bears the title of official geographer. His name is Robert Bradford Marshall and his business is the ostensibly prosaic task of helping Uncle Sam to make accurate maps of this country. But a moment's reflection immediately reveals the fact that map-making is by no means a prosaic undertaking. It is a decidedly important branch of the government's work, for what could we do without maps?

And in the making of maps Mr. Marshall has braved the dangers of frontier days and penetrated the unchartered wilderness of the West with all the unswerving temerity of a hardy pioneer. For twenty years he has helped Uncle Sam to guide his inhabitants about a great big nation

Much of Mr. Marshall's time has been spent in rugged mountain sections, where topographical notes were obtained by climbing the wildest crags and canons and by making sketches in places where a mountain climber would hardly think of going. This extended through all kinds of weather and was often enlivened with adventure and the unexpected. Refractory mules, storms, snow-slides, avalanches, often compelled the recasting of best made plans

His experiences with men were also widely various. Most topographers were alert and energetic, but many were unskilled. The remainder of the party commonly consisted of frontiersmen, some of whom wore aliases and notches on their guns. Mr. Marshall was in magnificent man-making conditions and in these this quiet son of Virginia became resolute, intensely aggressive, and the master of both woodcraft and men He commenced at the bottom, developed steadily through constant experience and ceaseless vigilance, and after twenty years reached the top of his exacting profession.

ROBERT BRADFORD MARSHALL.

Photograph by D. B. Edmonston, Washington, D. C

Beset with Many Obstacles.

It was a careful survey made by Mr Marshall that showed Death Valley to be the lowest point in the United States, while numerous other surveys under his supervision show that Mount Whitney, California, is 14,501 feet above sea level and the highest peak in the United States.

He was in Sacramento superintending the Pacific Coast topographic surveys when the disaster overtook San Fran-

IN DEATH VALLEY, 276 FEET BELOW SEA LEVEL. THROUGH MR MARSHALL'S SURVEYS AND OBSERVATIONS IT WAS PRONOUNCED THE LOWEST SPOT IN THE COUNTRY. IT IS ONE OF THE MOST DIFFICULT REGIONS TO CROSS, AND THE DUST OF SCORES OF MEN WHO LOST THEIR LIVES IN THE ATTEMPT MINGLE WITH THE BLISTERING SAND

cisco. Instantly he ordered his men to send all equipment and supplies to the stricken city. Later James R. Garfield, then Secretary of the Interior, approved this unauthorized way of disposing of public property. A few hours after

MR MARSHALL AND HIS ASSISTANTS AT THE SUMMIT OF MOUNT WHITNEY, CALIFORNIA, THE HIGHEST POINT IN THE UNITED STATES 14,501 FEET ABOVE SEA LEVEL. WITH HIS MEN HE ERECTED THE CRUDE MONUMENT OF STONE THAT MARKS THIS ELEVATION

the disaster he found himself captain of a river steamer and in full charge of the generous donation of supplies which Sacramento had made haste to send to San Francisco

The Sacramento Citizen's Committee and Governor Pardee were unanimous in urging him to deliver and distribute it. *En route* his steamer was repeatedly stopped to receive supplies from the towns along the way. Twenty-four hours after the earthquake he landed a boatload of commodities in San Francisco

Men respect him for his power and honor him for his moral courage One incident will serve to illustrate his domination over conditions and obstacles and show why he has a masterly control over men. The flooding Merced River had stopped the transfer of his survey outfit. It would be days before the waters would subside. It was important that an immediate crossing be effected. Every one except Marshall thought this impossible. Assembling his outfit on the swollen river's edge, Marshall gave each man careful instructions

Before any one grasped his intention he swung upon his mule to swim across for the purpose of attaching the end of a transfer rope to a tree on the opposite side of the river. That this extremely

MR. MARSHALL MAKING A SURVEY FOR THE GOVERNMENT FROM ONE OF THE LOFTY PEAKS OF THE SIERRA NEVADAS THE HIGH WINDS MADE IT IMPOSSIBLE TO USE THE INSTRUMENTS UNTIL THEY WERE FASTENED TO PEGS DRIVEN INTO CREVICES

dangerous task should not be performed by Marshall was instantly protested by the outfit. The Chinese cook insisted with: "Mr. Marshall, you must not risk it we cannot afford to lose you; let me do it. I cannot swim, but if I am drowned there will be only one Chinaman less."

Mr. Marshall concealed the feelings which this heroic devotion to him aroused, smiled, and then, as in hundreds of preceding other dangerous situations, led the way, and the others successfully and enthusiastically followed.

Mr. Marshall is the most intimate friend of John Muir, the famous explorer. With Muir he has climbed peaks explored forests, and appeared before legislative committees in the interest of parks and scenery. The conservation of scenery is something he strongly commends. He was a member of the Yosemite National Park creation committee, and later supervised the survey of the boundary of the park. Recently he made a report upon the territory proposed for the Rocky Mountain National Park.

He is descended from Governor Bradford of the Mayflower, Chief Justice Marshall of Virginia, and Patrick Henry. He has earned his living since fourteen, entered the Geological Survey at twenty-one, married a worthy daughter of the Golden State at thirty, and at forty became chief geographer, and is directly in charge of the topographic survey work of the United States.

The Sunny Side of the Track.

SOME time ago a prize of $1,000 was offered for the best automatic train-stop. Since that time some thousands of inventors have deluged those in charge with ideas and models, says the New York *Sun*. One device which has effectiveness at least to commend it provides for a hook firmly fastened between the rails which will spring up after a train has passed to clasp the axle of the train behind. The ingenious inventor, however, neglected to explain why it was more advisable to wreck a train on a hook than on the train in front. One of the embryonic Edisons has his own idea of a prize contest.

"I accept your offer," he wrote to the judges. "Please send check."

"ANY one in sight yet to relieve me?" queried a lonely ham out on the desert, where operators were mostly of the tourist class.

"I don't know," unfeelingly replied the despatcher. "No. 53 set out a stock car here last evening, but don't know what's in it yet."

SHE was being shown through the Brooks Locomotive Works, at Dunkirk, New York, by the superintendent. Seeing a large boiler under construction, she said to the super:

"What is that large, round, iron thing?"

"That," said he, "is a locomotive boiler."

"What do they boil a locomotive for?" she asked.

"To make the engine tender," he said.

THE fat drummer who wanted the 12.20 train passed through the gate at just 12.21. The ensuing handicap was watched with absorbed interest both from the train and the station platform. At its conclusion the breathless and perspiring knight of the road wearily took the back trail, and a "red cap" came out to relieve him of his grip.

"Mister," he inquired, "was you tryin' to ketch that Pennsylvania train?"

"No, my son," replied the patient man. "No; I was merely chasing it out of the yard."

CHINAMAN: "You tellee me where railroad depot?"

CITIZEN: "What's matter, John? Lost?"

CHINAMAN: "No! Me here. Depot lost."

FLANNIGAN and O'Brien of the section gang were dining at a swell restaurant. They were not accustomed to going to such a place. When they had finished, the waiter asked: "Shall I bring you a couple of demitasses?"

"Not on your loife!" exclaimed Flannigan. "Our wives might drop in and see us."

THE engine groaned,
The wheels did creak,
The steam did whistle,
And the boiler did leak.
The boiler was examined,
They found it was rusted,
And all on a sudden
The old thing busted.

SCIENCE MADE SIMPLE.

BY C. H. CLAUDY,

Author of "How Wireless Works," "How the Parts of a Locomotive Coordinate," etc., etc.

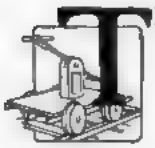
An Up-to-Date Record and a Discussion of the Latest and Most Important Events in the World of Science, Written so as to Be Easy to Understand.

C. H. CLAUDY
Photograph by Harris & Ewing, Washington

SOME EVERY-DAY MIRACLES.

How Type Is Set by Machinery. — Mysteries of the Pipe-Organ. — Will an Aeroplane Ever Be Invented that Will Remain Motionless in the Air.

WONDROUS WEDGE-SPACE.



THERE are certain things which are commonplace to us all, yet even these things become wonderful if we stop a moment and think about them. This character of wonderfulness is, after all, a sort of inverted pride in the power of muscle or the intelligence of brain. A machine is powerful when it is far stronger than a horse; it is miraculous when it apes human intelligence; it is clever when it does something human hands can do, but does it better, more regularly, and much faster.

Strictly scientific wonders in instrument, experiment, and the form of finished apparatus are all about us. Telephone, electric car, doctor's microscope, and surveyor's transit are commonplace examples. We are surrounded with mechanical wonders, but because of our admiration for the apparent complications which we do not understand, we frequently miss the real wonder of what is before us.

There is nothing which inspires wonder in the printed page. Yet, concealed in the parentage of almost every bit of printed matter is a genuine marvel the marvel of how a bit of thinking, calculating human brain is transferred and incorporated in a tiny part of a complicated machine.

How Type Is Sized.

Type is sized according to the "point" system. A point is one-seventy-second of an inch. Printers measure the length of a line of type by what they call "ems." An em is twelve points wide and twelve points high, and is, therefore, one-sixth of an inch square. No matter what size of type is set up, the length of the line is measured by ems. A three-inch line is eighteen ems wide, a four-inch twenty-four, and so on through the many variations in length.

In measuring the amount of matter in a page or galley, ems are also used, but in this instance it is an em of the particular sized type of which the matter is composed. As an example, a printer is setting a fifteen-em (2½-inch) line in six-point type. It follows, logically, that fifteen ems (each 12-point standard) will accommodate twice as many six point ems. Therefore the fifteen-em measure will contain thirty ems of six-point composition

A good hand typesetter can set up about 1,000 ems of fairly small type in an hour. But a good linotype operator can with ease set up 5,000 ems of the same type in an hour. So the machine and one man do the work of five.

The machine which sets up the printed matter in most of the magazines, newspapers, and books published to-day is called the linotype. It is not truly a type *setting* machine, since it does not set actual type. Instead, it sets or arranges in proper order the matrices or little molds. It then places these matrices in a mold, injects hot metal against them, and turns out what is technically known as a "slug"—a long, narrow, thin piece of metal, bearing upon one edge a line of letters or faces on one "shank" or body. It is a "line of type," molded in one piece, hence the name linotype.

Marvelous Steel Arm

Many have visited newspaper offices and seen the "battery of machines," as they are called the long rows of these tall, oddly shaped engines, each with its operator, with his hands slowly and unhurriedly passing over a keyboard not unlike that of a typewriter, only larger and with a far more sensitive touch. Those who have gone close to such machines have watched the little brass matrices as they come tumbling down through the channels from the magazines, one after the other, helter skelter, but each, in some wonderful way, in its proper place to form words and sentences.

The curious visitor will watch with interest the line of matrices and the "spaces" or wedges which separate word from word, and in some cases letter from letter, as it is picked up and carried to the mold, where the hot metal is forced against the matrices. He will see the hot, finished slug pushed out in position.

He will see a steel arm descend, open its fingers, and pick up the little brass matrices and carry them up to the magazine. He will notice that the spaces or wedges are left behind and racked by other arms, seemingly human in their intelligence, into their proper place. He will walk behind the machine and watch the little brass matrices being carried across the back of the magazine by woven gears, and see each drop into its proper place, from whence each will be called, when its turn comes again, by the delicate touch on the key below.

All the Same Length.

He will wonder how each capital, figure, small letter, italic, or character gets into its proper box, and may properly admire the little system of nicks on the matrix which guides it always to its proper home. But unless some one explains to him, he will miss the *real* wonder of the whole machine, even if he watches it for hours at a time.

For it is not the automatic features which are most wonderful—it is not that the proper matrix comes down in place when the proper key is touched—it is not that the automatic arms pick up and properly distribute the matrices. Those were not the hard things to invent in making this wonderful machine. The hard part, the really wonderful part, was to put a printer's brain into the mechanism.

Printers have a meaning of the word "justification" which is different from that of the layman. A printer "justifies" a line of hand-set type when he makes it exactly the proper length. In setting type it is very important that all the lines of a given column be exactly the same length—the same to a hair. Look at any of the lines on this page and you will see that they are all the same length, though some have more letters than others. You can easily find lines in which the spaces between a few long words are greater than those between the shorter and more numerous words of some other line.

Were this page set by hand these

wider and narrower spaces, or the wider spaces between a few letters in a word at the extreme right of a line, would be the result of the printer's justification. In this process the printer inserts little pieces of metal, "spaces," between the words, or between the letters in a word, so that, regardless of how the number of letters and spaces happen to divide up into the length of the line he is using, the line itself is exactly the same length as any other line.

How the number and size of the words in a line would make the line vary in length were there no process of justification can easily be realized by looking at any typewritten page. Here the lines are of many different lengths. The space between all the letters is the same—the space between the words is arbitrarily one, two, three, or more letter-widths. The typewriter writes an unjustified line.

It Baffled Inventors.

It is easy to see how the intelligence of the printer enables him to justify a line by selecting thin spaces to fill out a little space or thicker spaces to fill out a larger space. We can understand how he distributes these between letters or between words or both to make a proper line.

But how is a machine going to display that intelligence?

That was the question which baffled inventors from the time of William Church, in 1820, up to the time of Mergenthaler and Lanston. And the principle of justification in the Mergenthaler machine, the way in which the soulless, brainless mechanism produces lines of the same length, properly spaced, is the *real* wonder of the linotype.

And it is simple. Do you think of some complicated thinking machine, some calculator of spaces, some machine of involved mechanism? It is nothing of the kind. Those steel pieces which are the spaces between words or between letters in the little line of matrices which forms in the machine as the operator plays upon the keys do this work of justification. The steel space-bars are of a peculiar construction—they are thin and slender wedges, dual in nature, so that one part of them slides upon the other part.

The Space-Bar Did It.

When the line of brass matrices bearing the faces of the letters which will form a line of words is ready to be pressed against the mouth of the mold, where molten metal will be forced against it, a plunger pushes sturdily on the bottoms of these space-bars or wedges. The wedge part ascends.

The matrices are spread to the exact length of the line then being cast.

The matrices are absolutely and accurately justified. All lines are thus cast identically the same length.

The wedge space-bar, invented by Jacob Shuckers, of Washington, made the linotype commercially possible. It is the connecting link between the intelligence of the printer, who touches the proper key and sees that enough space-bars are in a line, and the brainless machine, which translates this effort of intelligence into an absolute justification—not by involved and complicated mechanism, but by the simplest and most ancient of mechanical principles—the wedge action which Archimedes knew two thousand years and more ago.

*

PIPE-ORGAN'S MYSTERIES.

THE devout man who attends church regularly may be pardoned if he goes away with the grave tones of some great organ ringing in his ears, but with no wonder in his heart. Yet a great organ, be it church or concert type, is a truly wonderful mechanism.

Consider for a moment what an organ actually is. The unaided human being can play a flute, a single pipe with devices for altering its acoustic length. Having but one mouth, however, he can play but one flute at a time. The "syrinx," or "Pan's Pipes," of ancient times, was, it is true, formed of several pipes, but these could be played by the mouth only one at a time.

Imagine an orchestra of a thousand flutes—flutes big, flutes little, flutes high, flutes low, flutes which sound like horns, flutes which imitate strings, and flutes which imitate reeds. Suppose this orchestra of a thousand flutes was under

the absolute control of a man, so much so that he could play upon it merely by thinking of the music he would make.

One, two, ten, a hundred flutes in this mythical orchestra will be played at the same instant, at the nod of the conductor's head, at his mere gesture, sounding in marvelous harmony. Would not such an aggregation demand homage, not only from the music lover, but the lover of great spectacles?

The organ is just such a flute orchestra

A House of Sounds.

A great organ may have a hundred speaking "stops," ten thousand pipes, five keyboards for the hands, one for the feet, dozens of "couplers" which connect one keyboard with another. Miles and miles of electric wires run about the huge "house of sounds," as it has been aptly called. Everywhere is the "wind" or air under pressure, hurrying here, there, everywhere, in pipe, channel, and wind way. For each key, for each stop, for each pipe, a multiplicity of valves, that when the key is depressed the pipe or pipes called for may "speak" and stop "speaking" at command.

Were each pipe a flute, as blown by a human being, and supposing there were human beings capable of supplying wind to blow a "flute" thirty-two feet long and as big as a man's body in section, it might take several thousand men to play upon all the pipes in the organ. Yet one man, never playing with one pair of hands and one pair of feet more than eight or ten keys at once, may sound dozens of pipes in unison, in harmony, in octave, in sympathy, in differential tone, in melody so constructed that all the harmonic tones the ear requires are represented.

Generations of men have given their best of thought and time to perfect delicate, accurate mechanism for the making of a huge machine which, practical, scientific, complicated, elaborate in mechanism though it is, yet touches men's hearts. So the mighty house of sounds, by which one man, aided by mechanism, does what a thousand, unaided, could not be drilled to do, is really wonderful mechanism when the ability of that mechanism to ape human endeavor and excel the human mechanism is considered.

Plays Upon a Dozen Pipes.

But it is not, after all, in the fact that the organist can play at one and the same time upon dozens of pipes from the several thousand which the instrument places at his disposal which makes the organ so wonderful. Its true marvel is that, like the many adaptations of electricity, which man makes, he bends the laws of nature to his will without understanding them. No one knows definitely and finally just how an organ-pipe "speaks," to use the technical term, or just what laws make its tone that of a string, a flute, or that inimitable tone known as organ tone.

The small boy cuts a length of willow stick in the spring, rings it with his knife-blade, beats the bark until it is loose, cuts a notch in the remaining stick, a nick in the cylinder of bark, and produces a "penny whistle" of ear-splitting quality.

The organ-pipe is an overgrown penny whistle. From the huge "double open diapason" pipes, as they are called, the largest of which would make a very respectable factory smoke-stack, to the tiny little pipe whose voice is so high and faint and shrill it seems unnecessary to place it in the organ, the "flue work" of an organ are but scientifically made whistles. But what a variety of whistles is here! Pipes are round, square, triangular. They are of wood, of different kinds of metal, open at the top, closed at the top, or half-open and half-closed, with one mouth, with two mouths, some with reeds and some without, long, short, fat, thin, in endless variety.

No Organ Wholly in Tune.

Let no one think of an organ only as a collection of huge whistles, with a mechanism for blowing them at will. For this huge house of sounds is constructed according to the most abstruse and scientific mathematical laws, and, stranger yet, some of the laws no man understands. Grave scientists still wrangle about what makes an organ pipe

speak and as to why a certain pipe gives a certain tone when another pipe, precisely like it save for a minute difference in the shape of the mouth of the pipe, gives a totally different tone

Take an open pipe eight feet long, which speaks a certain low, grave note. Put a top on the pipe, and the note immediately descends almost a full octave. Take a pipe of certain length and cut a hole in it; the note ascends

The organ is full of such peculiarities and contradictions. For instance, no organ was ever yet wholly and entirely in tune. Temperature is the main reason. Tune an organ at seventy degrees temperature, raise or lower the temperature one degree, and different pipes are affected in a different degree. Draw the stop on an organ labeled "mixture, three ranks," and press any single key. Not a single note, but a beautifully flute-throated chord of three notes answers.

Press two keys or three keys which ordinarily would form a chord in harmony. The result is a squeal beside which that of a pig under a gate is music itself. Now draw the stop called "open diapason" and depress the keys of your chord. Although the same pig-squeal is sounding, it is no longer heard as a squeal, but as a deep, beautiful, rich note.

Not a Squeal, but Music.

The reason is most curious and most interesting. When a violin bow is drawn across the string we hear a certain note—let us suppose it is the D string which is being sounded and we hear the note D. With that fundamental note of D sounds also the octave note, then still another note which is twelve tones above, again another note fifteen tones above, another seventeen tones above, and so on, until the sounds of these "harmonic tones," as they are called, die out in altitude too great for human ears.

Our ears do not distinguish these tones, which are called "harmonic" tones by their presence. We distinguish them by their absence. When a musical note is sounded which is pure, consisting only of the fundamental tone, we feel a thinness, a lack, as if we were looking at a picture of a background with no foreground.

There are certain pipes in the organ which give little but the fundamental tone. The open diapason is one, a plain, round, metal pipe of grave, sonorous voice. The mixture-three-rank stop is designed to sound faintly but truly all the harmonic tones which will enrich this grave note. The harmonics alone for one note are beautiful. For two notes together they may make, alone, a pig squeal discord. With their fundamental note, they give body, gravity, roundness, to the whole tone.

The Acoustic Sympathy.

Organ-pipes, like people, have their likes and dislikes. Place two pipes which speak the same note of nearly the same quality side by side. One would think that both, sounding together, would give a note twice the volume of either pipe singly. They don't. By a curious sympathetic action, which no one understands, they muffle each other's note to a large extent. This curious "acoustic sympathy" has taught builders not to put similar pipes speaking the same note near to each other in the organ

There is a peculiar phenomenon known as "differential tone" in the organ. By it, when certain notes are sounded together, the ear hears, *not* the two which are sounded, but a third note, graver and deeper than the other two. No man understands why.

The next time you hear a great organ and find pleasure in its grave tones or its brilliant flutelike melody, remember to give your tribute or admiration to this greatest of all single musical instruments, this thing too large for the invention of any one man, this collection of "Pan's pipes" which has grown to be so large, so comprehensive that not a thousand musicians, all playing together, can equal it when properly played by one man who understands its complicated manipulation.

AVIATION'S BIG PROBLEM.

MANKIND for all the years of his civilization, save the last fifteen, looked upon the birds, yet said: "It is

impossible for a mechanism heavier than air to be supported by itself in the air!" Here and there was an inventor, a discoverer, or a philosopher who believed the contrary who thought that merely because birds did fly and because birds were heavier than air, therefore machines heavier than air might fly. The public pointed to ships and said:

"They float because they are lighter than water. Make them heavier than the water they displace and they will sink. Look, also, at the balloon. It floats in air because it is lighter than the air it displaces —make it heavier than the air it displaces, by overloading it with sand, and it will not rise."

Nevertheless, birds flew—and now, as all the world knows, so does man. He flies, too, in machines which are very much heavier than the air they displace. A thousand-pound flying-machine is commonplace. The machine which does artificially what the bird does naturally is one of the greatest wonders of the century—the fact that familiarity with it makes it seem normal does not in any degree lessen its wonder

Missed It for Years.

Like almost all epoch-making, revolutionizing discoveries, its principles are simple. It is difficult to think of any of the great inventions or discoveries which are not simple. Telegraph, telephone, electric light, electric motor, wireless, type-justifying device, church-organ principles—they are all simple in essentials, no matter how complicated they may be in practical application.

Flight in flying-machines was also found to be simple. For thousands of years man had missed the point entirely. He had thought that because a ship floats in the water, so must a flying-machine float in air. He had missed entirely the point given him by birds, which are heavier than air.

The difference is plain now. Birds fly and man flies, not by being lighter than the air, but by getting from the air a recoil or lifting force. This lifting force must be equal in force to the time it is required for the action of gravity calling the weight down. Standing perfectly still, a one-hundred-and-sixty pound man requires nearly two inches of ice to support his weight. Put him on skates in flying motion and he will not break through ice less than an inch thick. His weight is off the ice before it has a chance to break.

In some such manner do a bird and an aeroplane fly. They are both constantly falling through the air, due to the action of gravity; but, due to the force of the push of their wings or aeroplane surfaces against the air, they are constantly climbing in the air. The recoil upward which they get from their motion against the air is equal to the motion downward they get in the same time from the action of gravity. So, action and reaction being equal, they remain at a level.

Problems That Mean Speed.

This, in its academic form, was the simple principle which the philosophers had missed. Its practical application took many years, many lives—indeed, the end is not yet. There is much which we must learn. We know that our curved surfaces must have a certain peculiar parabolic curve to get the maximum lift or recoil from the air when these surfaces are thrown forward against it, and we know to a hair how much push will be required to support a given weight with a given surface. We know how increasing the surface will permit the speed to be decreased, or how increasing the speed will permit surface and weight to be decreased

Speed in the air is now a mathematical calculation. So much engine-power requires so much weight of engine. So much thrust with such and such a wing surface will give so much lift — which must equal the whole weight. So much weight, so much thrust, will produce so much speed.

Increased engine-power for weight, increased propeller efficiency to get the benefit of the power, decreased air friction with the surfaces — these are the problems which enter into speed.

All this is wonderful, though an every-day matter. The real wonder of the aeroplane, as the scientist sees it, is not that it can go so rapidly, but that it can go as slowly as some of them have flown.

The late Wilbur Wright set his keen

mind on a truth not yet well realized by the flying world when he said:

"The problem of flight is no longer how to go fast; the problem is how to go slowly, to make a machine which will hover, almost stationary, as a bird hovers."

But how to go slowly? How learn to hover? Increase of surface means decrease of necessary speed. But it also means increase of weight in an alarming degree. Twice the surface means four times the weight if the same structural strength is to be maintained, and that means more engine to drive and still more weight. There are problems which the bird has solved on which we but stand at the threshold.

Undoubtedly the time is coming when the flying-machine will be a commercially practical vehicle. Tentative beginnings have been made. We use it in war, we have delivered mail by it, the picture of an aeroplane on a parcels-post stamp is a prophecy of the future; but the great problem of safety remains to be solved a problem which goes hand in hand with that the great master of flight, unhappily taken from his labor before it was completed, so well understood.

The wonder of wonders of the aeroplane is yet to come. On that day when a flying-machine — it cannot be here called an aeroplane, for it may be something entirely different — manages to hover, motionless, in the air, as a bird can hover. We do not even see the solution now. The marvel of speed, of flight like that of birds, is still bewildering, but no one who thinks of the future looks at a hovering bird and says, "It can't be done."

Since Lilienthal glided, since Langley made his flying models, since Wright demonstrated that a heavy machine could fly, we have discarded the incredulous attitude. We have even stopped wondering at the most wonderful sight any human being ever saw—that of a man and half a ton of metal and wood and cloth a mile in the air, riding safely and accurately as the birds ride. To-morrow, next week, the hovering, flying-machine may come to pass. Dare you, who look at a bird poised ready for flight, say, "There isn't any such thing as stationary flight"?

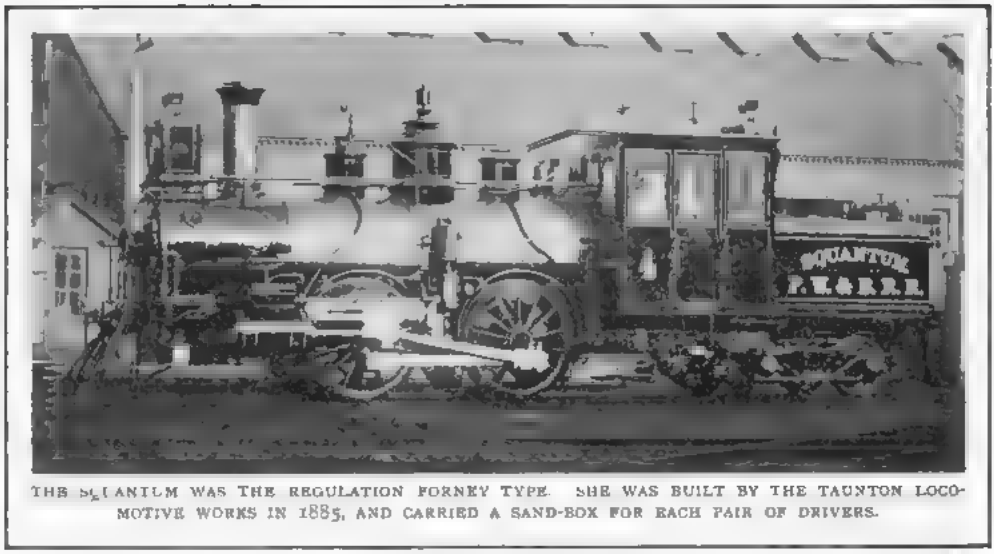
THE GREAT STEEL WAY.

BY LYDIA M. DUNHAM O'NEIL.

Ah, yes! You may prate of your air-ships and their glory that is to be!
Of how they shall fly through the boundless sky, over the land and sea.
You may prate of their birdlike beauty, of the shining wings that soar,
And the joy of flight through the still, vast night in the sea that has no shore.
But ever, as long as the pale moon shines by night, or the sun by day,
Must ye bend the knee in honor to me—the monarch, the great steel way.

Ah, yes! They are wondrous creatures that fly at a dizzy height!
A whir of wings like a bullet sings—a moment—'tis lost from sight!
And they soon shall be well-nigh countless and their wings shall busily hum,
And the trackless course shall be a source of wealth in the days to come;
But never, as long as one faint start to earth shall direct its ray,
Will the air-ship claim a greater name than that of the great steel way.

For the key to the gates of commerce the mighty railroads hold,
E'en at this hour, one-half their power undreamed of is untold
To-day, o'er each mighty river, prairie, and mountain-crag,
Great engines dash and whirl and flash, and precious burdens drag
And they laugh at the fair, frail creatures that flit like butterflies gay -
That feebly fly and vainly try to rival the great steel way



THE SQUANTUM WAS THE REGULATION FORNEY TYPE. SHE WAS BUILT BY THE TAUNTON LOCOMOTIVE WORKS IN 1885, AND CARRIED A SAND-BOX FOR EACH PAIR OF DRIVERS.

OLD GIRLS THAT SET THE STYLES IN ENGINES.

BY ARTHUR CURRAN.

ARTICLE II.

YEARS ago it was customary to use Forney engines or some similar type in suburban service. The object was to get a handy little machine that would start promptly and run in either direction with facility and safety.

The absence of a separate tender made it possible to run backward with far greater ease than would otherwise be possible. It will be understood easily that by eliminating the necessity for turning at the end of each short run a great saving in time was effected. In addition to this, Forneys were cheaper to build than standard passenger types Being intended for a cheap class of traffic, this was an important consideration

The Squantum is of the regulation Forney type. She was built by the Taunton Locomotive Works in 1885 for the Providence, Warren and Bristol Railroad. It will be observed that there are two pairs of drivers under the boiler and a four-wheel truck under the tank. Two sand-boxes are provided, the bell being mounted on the forward one, as was usual in those days.

An interesting feature is the ornamental stack, a style which came into vogue when the diamond stack went out of fashion.

The Forney type—and the many others which resembled it -was very popular with at least some of the crews, owing to the design of the cab, which afforded complete protection in inclement weather. Some also liked the riding qualities of such engines.

As time went on changes in design took place. Some builders added a two-wheel pony truck; others used a six-

Mr Curran's first article in this series appeared in September. Back numbers for sale at this office

wheel truck under the tank; still others employed three pairs of drivers instead of two. The fundamental principle remained, however

In the course of events the popularity of the Forney declined. This is easily explained. When larger passenger engines became necessary the roads had to find employment for those that had been superseded.

The superannuated engines were assigned to local runs and no more Forneys were ordered. When the Forneys were worn out they were scrapped.

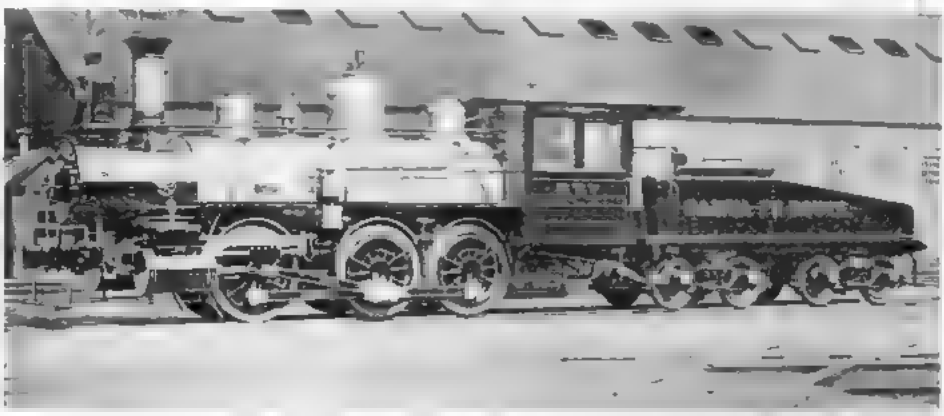
To be sure, there are exceptions. Small suburban engines are still used on the Putnam division of the New York Central and Hudson River Railroad, the Illinois Central, and, I believe, on the Grand Trunk. There may be others, but the tendency is to wear out old passenger engines and then electrify or adopt motor cars.

Although the day of the Forney appears to be about over, so far as this country is concerned, it is a curious fact that "tank engines"—as they are called abroad—are still popular in England and the continent of Europe, where they have been developed to a considerable size and are used for a variety of purposes. Few are built here now, except for contractors, mining companies, lumber camps, and plantations.

A number of years ago diminutive engines of this type were used on the New York Elevated Railway. When this line was electrified the tiny steam engines were sold and, it is said, scattered all over the world.

They were really too small to give a fair idea of what could be done with the Forney type. Had the use of larger engines been possible on "L" roads; the managements might not have been so anxious to electrify.

Among the many changes that have taken place in passenger and freight locomotives the switcher still remains pretty much what it used to be. A few roads are equipping switchers with superheaters, outside steam pipes, and the Walschaerts gear; but the majority of such engines are not fundamentally different from the Santa Fé engine shown herewith, which was built at Taunton Works in 1888.



OLD SANTA FÉ SWITCHER THAT PRESENTS A VERY MODERN APPEARANCE FOR A VINTAGE OF 1888
THE CROSS HEADS ARE OF A STYLE THAT IS STILL POPULAR

The arrangement of wheels, boiler fittings, and other parts is just the same as many switchers of to-day. Even the cross-heads are of a style still popular. The same may be said of the tender.

The principal differences are to be found in the stack and cab. The former is of the same style referred to in connection with the Squantum, which is curious because placed much lower than is considered good practise to-day

Aside from these features, this engine presents a rather modern appearance for the vintage of 1888. Of course, she is smaller than recent switchers; but I have seen scores of the same type no better either in design or workmanship.

HOWARD ELLIOTT, WHO SUCCEEDED CHARLES S. MELLEN AS PRESIDENT OF THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD SYSTEM. HE IS FIFTY-THREE YEARS OLD. TWENTY-THREE YEARS AGO HE BEGAN AS A FIREMAN ON THE CHICAGO, BURLINGTON AND QUINCY. HE WAS PRESIDENT OF THE NORTHERN PACIFIC FOR ELEVEN YEARS.

Photograph copyrighted by Moffett, New York.

THE NEW PRESIDENT OF THE NEW HAVEN RAILROAD SYSTEM.

Howard Elliott, Who Rose from Rodman to Executive After Thirty-Three Years of Efficiency and Endeavor, Assumes the Biggest Responsibility of His Career.

BY CHARLES A. WILLIAMS.

THE appointment of Howard Elliott to the presidency of the New York, New Haven and Hartford Railroad has made him one of the foremost figures among the executives of American railroads, for no other great system is so prominently in the public eye at present. A tremendous opportunity and a vast responsibility confront Mr. Elliott, but an unbroken railroading career of thirty-three years has peculiarly fitted him for a place where fine efficiency must obtain if the incumbent is to achieve success.

Few men know the railroad more thoroughly than he does, however, for in his long labors he has turned his skill to almost every department of the business. The story of his business life reads like the history of a man who had set out to master every side of his chosen work.

His was a well-planned campaign for mastery. He was well-equipped for the struggle when he began. Born in New York on December 6, 1860, he was graduated from Harvard University at the extremely early age of twenty, fortified with a degree in civil engineering.

Soon in the Executive Offices.

July 1, 1880, marked his beginning in railroading when he became level rodman with the engineering corps of the Chicago, Burlington and Quincy.

Three months of this and Howard Elliott switched to the executive offices, being appointed a clerk in the office of the president of the St. Louis, Keokuk and Northwestern Line. Later he became a clerk in the assistant treasurer's office of the same road. In 1887, at the age of twenty-seven, he was auditor and assistant treasurer of the C., B. and K. C., having been requested to assume the position by that road. Simultaneously he occupied a similar position with the St. Louis, Keokuk and Northwestern.

His capacity for work was extremely expansive—his energy is well indicated in the successful performance of two tasks, each of which furnished enough for one man. His career gradually broadened and extended into the numerous departments. Shortly afterward he became general freight and passenger agent for the same roads. Again he turned to new responsibility and new knowledge. From May 1, 1902, to October 21, 1903, he was general manager of five railroads—the Chicago, Burlington and Kansas City; the St. Louis, Keokuk and Northwestern; Hannibal and St. Joseph; Kansas City, St. Louis and Council Bluffs.

Chosen for Mr. Mellen's Place.

He had become a big railroad man with large abilities, a forceful personality, and a desirable addition to any road's personnel. Twenty three years of such varied experience prepared him for the second vice-presidency of the Chicago, Burlington and Quincy, in which capacity he served until he was elected to the presidency of the Northern Pacific, Washington and Columbia River, and the Minnesota and International Railways.

When Charles S. Mellen resigned as president of the New York, New Haven and Hartford, the appointment of his successor was a question that aroused interest throughout the railway world. It was a selection that required good judgment with little possibility of a poor choice. When Mr. Elliott's election was announced railroad circles knew that a big chance had come to a man who would handle it with skill and mastery and lend to it a broad knowledge of a long railroad life. Mr. Elliott is fifty-three years of age—old in experience of railway ways, but physically young—a commanding figure in the new generation of railroad presidents.

AN OLD ENGINEER'S ADVICE TO HIS SON.

BY FRANK M. O'BRIEN.

BE sure your thermal units are always right in tune; it's
An awful thing to hear a cross-head slide;
And those nifty Sheedy burners are most difficult for learners
If the laces on your brake-shoes aren't tied.

Keep your radial stays well laced up and your boiler-angle braced up,
So you'll never lack for superheated steam.
If your steam-pipe studs are missing you will hear the vapor hissing—
Just button them along the fire-box seam.

Never trust a pitted boiler; it may make of you a broiler,
And the Hancock inspirator won't inspire;
Take the old concentric nozzle, turn her on and let her sozzle;
Then use the rocking-grates to dump your fire.

If you hear a hectic chirrup, don't try any soothing sirup,
For the cough of the exhaust cannot be cured;
Nor can knuckle joints rheumatic be made good by moments static—
Let colds upon the steam-chest be endured.

Never work your whistle lever when you see a purple beaver
A playing in the moonlight on the rails;
But if elephant or hippo, then cut loose and let her rippo
And show them that they must not block the mails.

Always use the bumper-timber when the rocker-shaft is limber
And the counter balance-spring is out of gear.
Tap the boiler barrel often; let the Babbitt metal soften
And stand the faithful guide-yoke on its ear.

Gently oil the dear old buffer, lest they think you are a duffer;
Don't scratch yourself upon the center-pin,
You will find the best jaw-binders are for moguls, not stem-winders,
And the coal is in the tender, not the bin.

And if you absorb this knowledge you needn't go to college;
You can wreck a train without an item more;
And should the cops make bother, just blame it on your father
And say he cracked his pan in '84.

WILLIAM BRADY, M.D.

HOW SORES ARE HEALED BY NATURE.

BY WILLIAM BRADY, M.D.

The Fourth of a Series of Heart-to-Heart Talks to Railroad Workers, Trainmen, and Mechanics on Certain Ailments That Are Not Quite so Serious as They Seem.

SALVE is salve and nothing else. Some people like to apply it to everything figuratively and literally. Others prefer to have it applied like a face-massage at the barber's. When you find it necessary to treat cuts, bruises, scalds, wounds, and abrasions, to quote the salve advertisement, what else can we do to encourage healing but fight the germs? Take an ordinary scratch or laceration of your finger, for example. What heals it? And what prevents the healing process sometimes?

Nature does the healing—every bit of it. She does it in her own way, at her own rate, and with her own salve. You can neither change her method nor alter her working pace. She's been healing cuts, scratches, and abrasions since the year 1. Any tips we may have picked up in our short life are gifts of Nature.

Nature Won't Work Overtime.

Salves have two possible effects on the healing of a wound. They may delay healing, or they may not delay healing. They do not and cannot hasten healing in the least. No human agency can make Nature work overtime. The catchpenny laboratories cannot salve her one bit. She can't be greased. All she asks is that you will let her alone, let her do up the job in her customary satisfactory manner.

Two things ordinarily annoy Nature and delay her work: salves and germs. Of the two evils, salves probably do the most harm. Nature is usually able to cope with the germs if you'll give her a little extra time, but the salves are too many for her. She no sooner recovers from one insult than the old salve is removed and another figurative coat of tar and feathers applied. So she gets tired and lays off, leaving you and your salve to monkey with the wound just as you please for a time.

Harmful "Home Remedies."

You've noticed it yourself, how things come to a standstill after a certain amount of salving. You smear on a bit of carbolic salve and bind a rag over it and assure yourself that all is well, but you're sadly mistaken.

When you remove the rag the finger looks funny—all white and dead. You imagine you're getting blood-poisoning, so you souse on another insult and wait a day or so.

Finger feels kind of numb. You have another look. What'n thunder's the matter with the thing? Don't seem to be healing at all.

Well, you're not a bit worried, but just for fun you drop in at the doctor's. He cleans it up, applies a simple, aseptic (*not* antiseptic) dressing minus salve, and sends you on your way, poorer but happier.

Dr. Brady's series began in July. Back numbers for sale at this office.

One salve is useful in the dressing of wounds of any size provided it be kept aseptic. That is vaseline—simple, undoctored petrolatum. It is neutral, harmless, keeps the dressing from sticking to the wound. But it must be aseptic.

You can render it aseptic by boiling it for several minutes and keeping it tightly covered, but after you've uncovered it and dipped into the box, it is no longer aseptic—that is, germ-free. You can buy it in collapsible tubes, squeeze out what is needed for a dressing, and preserve the remainder intact

Carbolic salve is one of the most vicious "home remedies" on the market. Many a time it has caused gangrene of an entire finger when applied for a simple cut. Invariably it delays the healing process—though some people like to keep a thing unhealed as long as possible so they can nurse it and fuss over it like an old maid puttering over a baby with the colic.

How Nature Destroys Germs.

Such people carry a finger-bruise as if it were a broken arm, and look hurt if you don't sympathize with them. If you want to win the eternal admiration and gratitude of one of these bruisie nurses, just suggest any old salve you happen to think of, no matter what, so long as it has a nice, salvy, old-fogy odor, and urge the sufferer to try it.

Be careful of your choice of language. Don't say, "Apply it." That sounds cold and scientific. Say, "Put a little onto it"—*onto* it, mind you! That sounds just like grandma might say it.

Blood-poisoning, or septicaemia as we long-winded doctors like to call it, is due solely to germ infection of a wound. Colored stockings, tin, copper, verdigris, dye, chemical substances, and iron rust have nothing whatever to do with it, contrary to the average reporter's version of bad cases.

If the skin is free from pus microbes, and if the implement that inflicts the wound is germ-free, there will be no chance for blood-poisoning

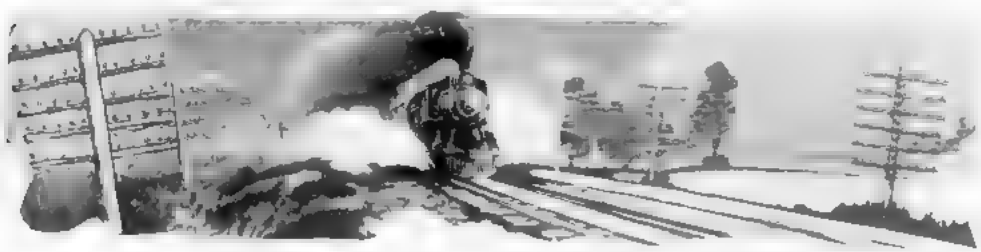
Dirty salves, dirty rags, dirty fingers may implant the necessary germs at the first dressing, but Nature ordinarily takes care of these without trouble. The bleeding washes out the germs and the blood itself destroys any germs which remain.

Let the Wounds Alone.

Deep punctures or lacerations which bleed little or none at all are like vaccination wounds well suited to the implantation and development of any germs which may have been on the skin or the implement causing the wound. These should always have the doctor's attention, particularly in warm weather when lockjaw germs are thriving.

Since an "antiseptic" of some kind is craved by everybody, care should at least be taken to select one which shall not injure the tissues needlessly. For promiscuous use a harmless and effective antiseptic application is plain tincture of iodin (the brown liquid). This may be painted all over the skin about the wound and in the wound itself, then laid away. One coating is enough. After that, keep the wound protected with baked linen, muslin gauze—and *let it alone*.

Letting wounds alone is the most effectual thing we can do to aid Nature in the healing process. Once cleansed properly, the blood serum, the clot, the scab itself is the ideal dressing. After ordinary operations we rarely look at the wound within a week. Nature is recognized as the best surgeon.



OLD "GENL. HAUPT" BUILT FOR THE CIVIL WAR.

Named for Famous Railroad Builder in Charge of the United States Military Railroads at that Time.

UNCLE SAM was some railroad owner during the Civil War. At that time, in order to convey the Federal troops and ammunition, he built what was known as the United States Military Railroad. Its right-of-way was over the tracks of any railroad it chose to travel on The regulation cars of the time were used, but the government ordered from William Mason, the leading locomotive builder of his day, thirty-one locomotives similar to the "Genl. Haupt."

"GENL. HAUPT," ONE OF THE THIRTY-ONE LOCOMOTIVES BUILT BY WILLIAM MASON FOR THE UNITED STATES MILITARY RAILROAD A LINE OWNED AND OPERATED DURING THE CIVIL WAR BY UNCLE SAM

Photograph by courtesy of Charles E. Fisher Ann Arbor, Michigan

These thirty-one locomotives were noted for the gaudy colors in which they were painted. Their decorations were always noticeable, and it was the pride of every man who ran them to keep them as bright and shining as possible. They were known as the fastest engines of their type during that historic period

The corps of war locomotives were named as follows: "D C. McCallam," "W H. Whiton," "E. L. Wentz," "H. L. Robinson," "General Haupt," "General Burnside," "General Sickles," "General McCallum," and "Little Rock." The others bore the following numbers: 38, 39, 85, 86, 186, 187, 188, 189, 190, 191, 192, 222, 223, 224, 225, 226, 227, 228, 229, 230, and 231

General Herman Haupt was a designer and builder of bridges; a constructor and builder of tunnels; a professor and author; an inventor and master mechanic; a military strategist and civil councilor; a railway manager and canal engineer; a manufacturer and organizer of great enterprises; a military and civil engineer

He was born in Philadelphia, March 26, 1817. At the age of thirteen he received his appointment to West Point. He entered at the age of fourteen and graduated in 1835. He resigned his commission to become assistant engineer under H. R. Campbell in surveying the railroad from Norristown to Allentown, Pennsylvania

In 1836 he was appointed principal assistant engineer of the Pennsylvania State Railways and Canals, and located the railroad from Gettysburg to the Potomac—now part of the Western Maryland.

In 1840 he was engaged to aid in the construction of the York and Wrightville Railroad It was on this road that he commenced his study of bridge construction. On the completion of this road he was appointed professor of mathematics and engineering at Pennsylvania College, Gettysburg.

In 1851 the Appletons published his

book, "General Theory of Bridge Construction," and from that day engineers began to calculate stram sheets and distribute material so as to meet the varying requirements of self supporting pendent structures

In 1846 General Haupt applied to President Samuel V Merrick of the Pennsylvania Railroad for a position, but was told that engineers were as thick as blackberries, so he returned to Gettysburg. A short time after this he was sent for by John Edgar Thomson, chief engineer of the Pennsylvania Railroad. He assisted in the entire revision of the Juniata Division, sixty miles.

His counter braced arch won him fame and in 1848 he was promoted to principal assistant engineer. When the first division was completed he was appointed general superintendent, and was directed to visit New England to examine the system.

Began the Hoosac Tunnel.

On his return he submitted a plan of organization and management, with forms and blanks for every branch of the business, which was adopted without change, and which, modified to meet subsequent new conditions and features in transportation, is in use to this day on what is generally considered the best-managed railway property in the world. He remained with the Pennsylvania Railroad until 1853, and during that time rendered valuable service to that road.

In 1853 he became chief engineer of the Southern Railway of Mississippi. At the end of six months he was recalled to the office of chief engineer of the Pennsylvania, which he retained until the completion and opening of the line to Pittsburgh, including the Alleghany Mountain tunnel.

In 1856 General Haupt left the Pennsylvania and began the building of the Hoosac tunnel. He was attacked by the Boston and Albany, then known as the Western Railroad Company, which excited hostile legislation and which stopped eventually the State payments on which he relied to carry on the work. The contest was long and bitter, and was not settled for some time.

The tunnel was completed, but it depleted the personal fortune of Mr. Haupt. It was in 1861, while working on the tunnel, that he made his well-known improvements on rock-drilling machinery.

In Charge of U. S. M. R. R.

In 1862 he was called by E. M. Stanton, then Secretary of War, and placed in charge of the railways and transportation service of the Federal army. He was in charge of the United States Miltary Rail roads.

In 1870 he located the Shenandoah Valley Railroad, which was later built. In 1874 he was appointed general manager and director of the Richmond and Danville System by J. E. Thomson, then president of the Pennsylvania. This system extended from Richmond, Virginia, to Atlanta, Georgia. While holding that position, General Haupt prepared the plan for the organization of the Southern Railway and Steamship Association, which was later adopted

In 1878 he was employed by the Pennsylvania Transportation Company to build a pipe-line for the transportation of crude petroleum from the Allegheny Valley to tidewater. This was done despite the opposition of the Standard Oil Company, but the success of this mode of transportation led to its adoption by the Standard Oil Company.

In 1881 he was appointed general manager of the Northern Pacific Railway, which position he held until 1884, when he was elected president of the Dakota and Great Southern Railway.

STEAM LOCOMOTIVES INCREASING.

THE annual report of the Public Service Commission for the second district of New York shows that the number of locomotives owned by the railroads which operate wholly, or in part, in the State of New York, increased 4.6 per cent in the five years from 1907 to 1912.

The average tractive effort increased 17.1 per cent, and in 1912 was 30,200 pounds. In the same report an analysis is given of the causes of engine failures, and it is shown that hot bearings are responsible for 12.5 per cent, low steam for 15 per cent, steam leaks for 19.9 per cent, broken machinery for 19.5 per cent, miscellaneous, such as loose nuts, bolts, tires, wheels, burst air hose, *et cetera*, for the remaining 33.1 per cent

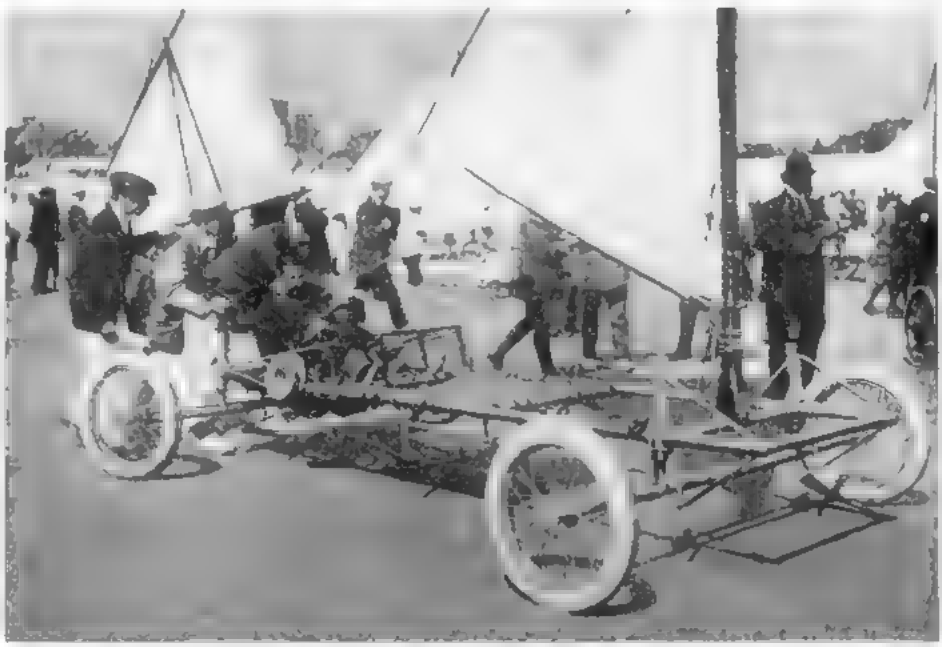
The report states that there have been no boiler explosions within the State in the five years during which the commission has supervised this work, notwithstanding the fact that there are over 6,000 locomotives constantly in use within the State.

CURRENT MECHANICS

A Department Devoted to the Progress of Mechanical Development—Written, Illustrated, and Analyzed So that It Is Plain to Everybody.

AUTO-BOAT RACES ON LAND AND WATER.

FOR freak land-and-water races Frenchmen are using the most curious type of auto-sailboat that ever plied the waves. A close view of one of these queer craft is shown in the accompanying illustration. It consists of a strong wooden frame carrying four wheels, a ten horse-power motor, and a mast fitted with a leg-o'-mutton sail. In addition to impelling the wheels, the engine drives a small propeller about sixteen inches in diameter. Owing to the light construction of the machine and the absence of any car-body, it makes remarkable speed on land, while on water the sails and propeller force the auto-boat ahead at velocities that approach the best records.



FREAK FRENCH AUTO-BOAT FOR THE LATEST SPORT—RACING OVER LAND AND THROUGH WATER. THE FRAME IS CONSTRUCTED OF WOOD AND CARRIES AN ENGINE WHICH ACTUATES THE WHEELS AND A PROPELLER. A MAST CARRIES A LEG-O'-MUTTON SAIL. THE BOATS RACE ALONG A SANDY BEACH AND PLUNGE INTO THE WATER FOR THE FINISH.

Photograph copyrighted by Underwood & Underwood, New York

172,500 POUNDS OF SAND IN BAGS PILED ON A CONCRETE SLAB TO PROVE IF IT IS SUFFICIENTLY STRONG TO BE USED IN THE NEW LOS ANGELES VIADUCT IF THE SLAB STANDS THIS EXCESSIVE WEIGHT IT IS ACCEPTED.

WEIGHTING SLABS TO TEST THEIR STRENGTH.

WATER for the use of the inhabitants of Los Angeles, California, is to be brought to that city from the Sierra Madre Mountains, some fifty miles away. It will flow through a concrete aqueduct that is a notable specimen of engineering skill. The concrete slabs of which the aqueduct is built were put to a severe test prior to being accepted by the constructors. The test was of a practical nature, as the photograph shows

Each slab was placed on four legs so as to form the base of a platform. On top of it were piled bags of sand. This process was continued until the slab gave indications of breaking. The weight and pressure that it would have been called on to endure when forming a portion of the aqueduct had been previously determined, and the bags proved the fitness or unfitness of each slab from which it had been chosen.

There are about 690 bags of sand on the slab photographed. Every bag contains 250 pounds of sand, so that the total weight that the slab is supporting is 172,500 pounds. This was in excess of the requirements of the constructors, but in all cases a wide margin of strain-safety was allowed. The number of slabs that collapsed before the maximum weight had been placed on them was very small

Each slab was molded of the finest concrete obtainable and measured approximately six feet wide, eight feet long, and two inches thick. It would be fatal, of course, if a defective or weakened slab were placed in the aqueduct. Under the enormous pressure of the water it would soon succumb, and what effect a slight leak might have on the whole of the structure it is difficult to determine. When attempting such an expensive and important undertaking the slightest neglect or foolhardiness would place the entire project in jeopary, and, as in big engineering feats, the utmost caution was necessary.

HOW THE PULMOTOR HAS DEFEATED DEATH.

A MARVELOUS apparatus, striking in its simplicity, has saved thousands of persons who a few years ago might have died. It is known as the pulmotor and is used for resuscitating victims of drowning, electric shock, gases, fumes, and other forms of complete prostration which do not injure any vital organs by mutilation. It is most largely used by the Edison Company of New York. This company has installed a pulmotor in every power station in the city, and every man in its employ, about 4,000 in all, has been instructed in its use. The pulmotors in the Edison stations are at the disposal of any hospital, the police, or any responsible citizen.

The pulmotor consists of an oxygen tank containing eleven and one-half cubic feet of oxygen, a small box containing two bellows, and valves which operate the bellows. From the oxygen tank, which will continue in operation for forty minutes, metal pipes extend to the valves, which are alternating in motion. The tank is equipped with a valve by which the flow of oxygen is regulated, and when this is turned on the valves work alternately. One valve actuates a bellows which forces the oxygen into the lungs, and the other a bellows which by suction withdraws it. From a small pipe connected to the bellows extend two tubes that are fastened to a rubber mask, which is placed over the patient's mouth

In using the pulmotor it is only necessary to lay the patient flat on his back, strap the mouth mask tightly over the lower part of his face, make sure that the air passages are not obstructed, and turn on the oxygen. The apparatus then operates itself. The picture shows a demonstration recently made in an Edison station. Statistics are not available, but it is certain that thousands of persons have been saved by it.

THE PULMOTOR WILL CALL BACK PERSONS WHO HAVE ACTUALLY ENTERED THE GATES OF DEATH BY FORCING OXYGEN INTO THE LUNGS AND DRAWING IT OUT UNTIL THE RHYTHM OF NATURAL BREATHING IS RESTORED IN THE PATIENT.

THE ELECTRICAL WIZARD OF VALHALLA.

SO much truth is there in the quotation about the man who, going into the tall timber, causes two blades of grass to grow where one grew before, thereafter finding that an interested public has worn a nice, firm path to the scene, that latterly they have been putting it out on penny post-cards. It was not the desire of Charles H. Ferguson to burst into the public prints as a wizard of low voltages, but the purring of his water-wheel penetrated inevitably to a busy outer world

Despite the ever-quickening retreat of the kerosene lamp, there were no electric service cables running near Mr. Ferguson's estate at Valhalla — New York State, not Odin's establishment. There was, however, a brook. It was in no sense a torrent, tumbling downhill from great altitudes; a yard wide and three or four inches deep, this particular brook is not even capable of an audible babble save when the spring freshets send it over the banks for a brief period.

ONE OF THE MANY ELECTRICAL CONVENIENCES IS A SEARCH LIGHT WHICH MR FERGUSON KEEPS IN HIS BEDROOM AND POKES OUT THE WINDOW TO INVESTIGATE STRANGE NOISES AT NIGHT

Nevertheless, hailing from near-by springs, it is the sort of brook that does not freeze in winter or dry up in summer, and it can be depended upon for about one hundred gallons of water a minute, with a total fall of ten feet

Figured out, this means theoretically a possible power-development of about one-quarter horse-power. Granting a fifty per cent efficiency, the quarter is cut to one-eighth horse-power, or about the rating of an ordinary fan-motor. According to the rules, one does not install electrical equipment for a house and grounds on one-eighth horse-power; but it was a sad day for theory when she came into conflict with Mr. Ferguson's practical originality at the brook-side

His power plant was completed when a dozen feet of flume had been built from the little dam and a ten-foot wheel installed, with some thirty five buckets on its circumference. Two pulleys were set on the main shaft The first is belted to a small pump in the wheel-pit, and, drawing upon a spring, fills a storage tank on the hillside and assures a steady water supply at an 80-pound pressure.

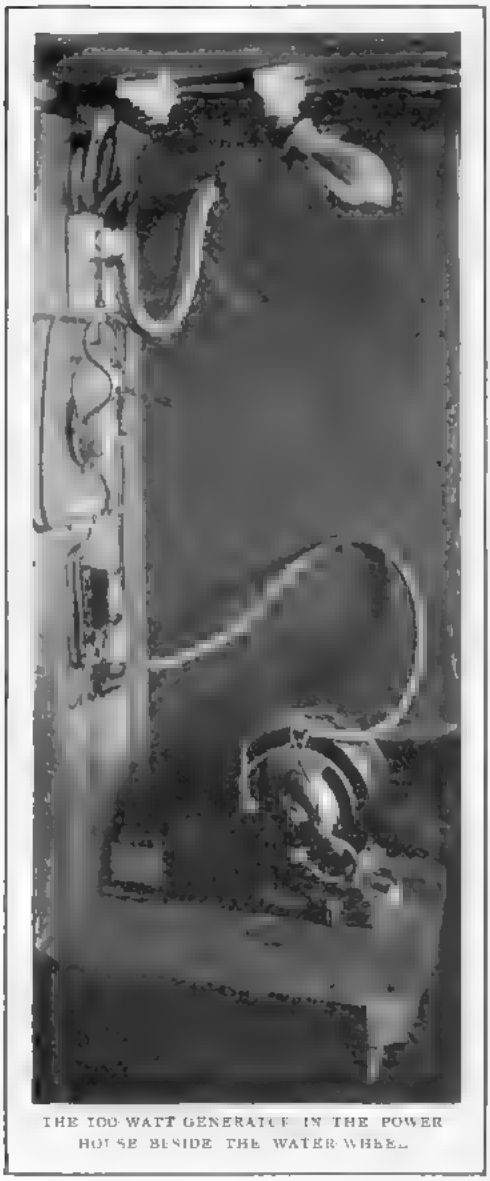
The second pulley runs a 100-watt generator in the doll house power-station beside the wheel a dynamo not larger than the average man's cranium and good for eight volts as long as the brook flows

In the cellar of the house itself six cells of 150 ampere hour capacity each constitute the storage battery and are so wired that they float continually in the circuit, ready to supply automatically any deficiency there may be in the dynamo current for a specific purpose or to take the place of the generator entirely when the latter is shut down Power house, electrical equipment and accumulators could be packed together in a good-sized suit-case without great trouble. According to accepted ideas,

THE OLD WATER-WHEEL ON MR. FERGUSON'S ESTATE AT VALHALLA, NEW YORK, WHICH DEVELOPS ABOUT ONE-EIGHTH HORSE-POWER AND FURNISHES HIS HOME WITH A COMPLETE ELECTRICAL EQUIPMENT

perhaps, not very much can be done with such a station. But there are about the Ferguson house and grounds nearly 100 eight-volt, 16 candle-power lamps. There are lights in the trees and the arbors; there are clusters in the living-rooms and further clusters in the verandas

If you desire a particular book, the touch of a switch will illuminate that book-case alone; if you wish to finish it before going to sleep, the touch of another will light the reading-lamp fastened to the head of the bed; and if, when you awaken in the gray dawn, it is exceptionally chilly, the turning of a third switch enlivens the electric bed warmer—a coil of heavy German silver wire in a sheet-iron case—and out in the snow-drifted power-house the faithful little generator does the rest.

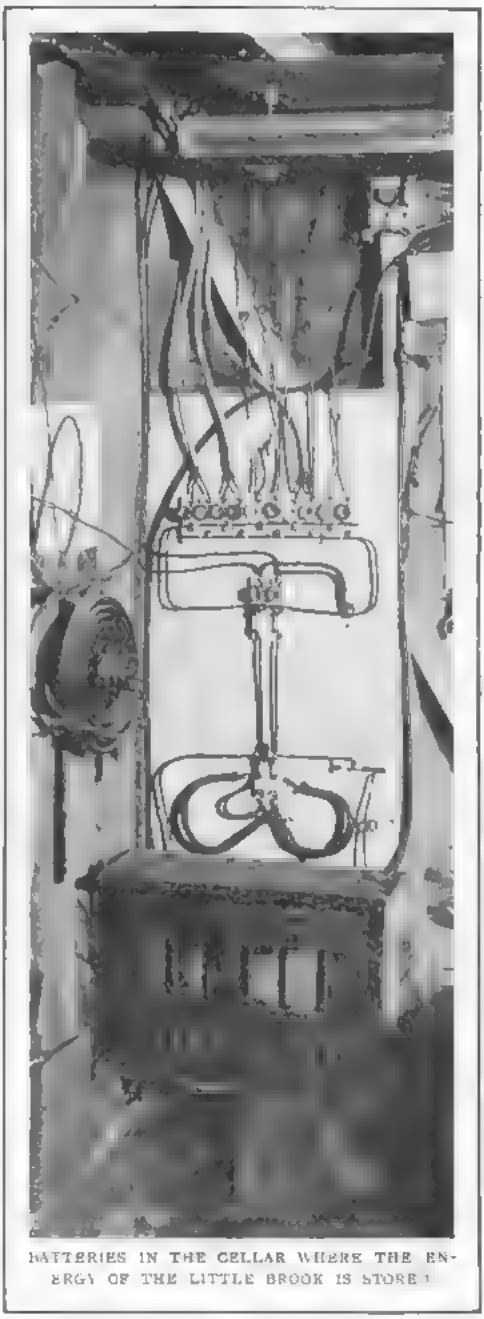


THE 100-WATT GENERATOR IN THE POWER HOUSE BESIDE THE WATER-WHEEL

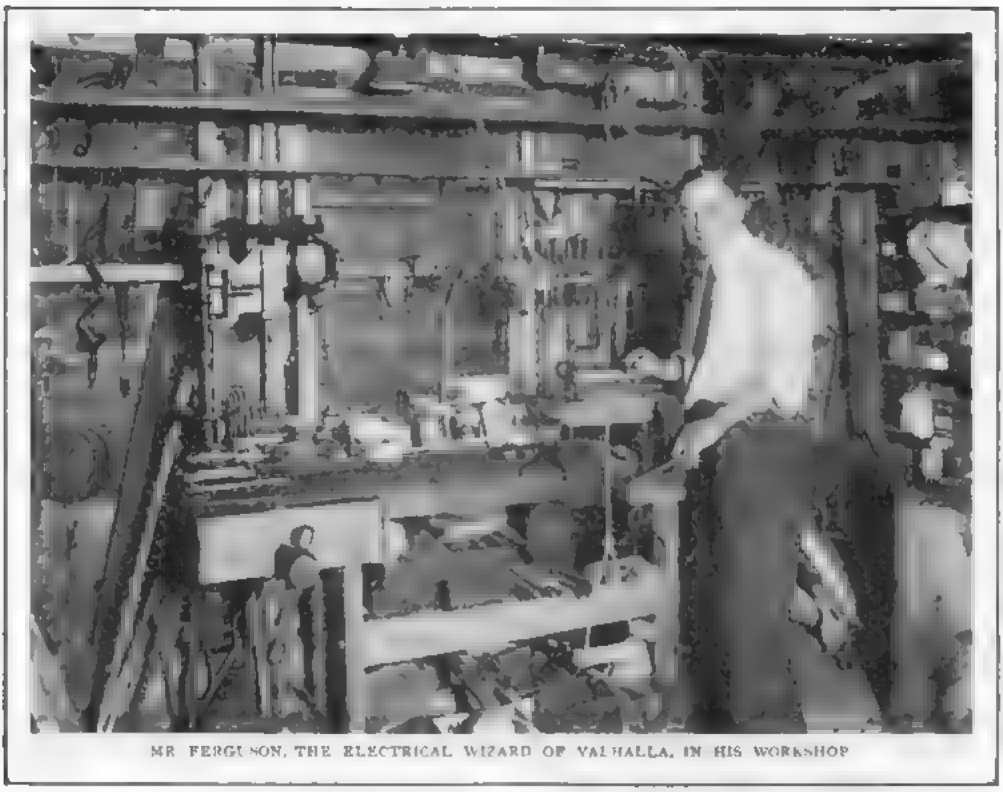
There are times, too, when strange noises outdoors rouse one in the dark hours. For the investigation of such Mr. Ferguson has provided a portable searchlight, capable of lighting up the landscape hundreds of feet away. Further, there is a lighting system in the automobile to be kept charged; the bijou generator attends to it in the odd moments.

With his eight volts led to the side of the dining-table, Mr. Ferguson is working quietly toward the elimination of the servant problem without resort to high-voltage electric methods.

Coffee is made at the table by the simple thrusting into the pot of an aluminum tube with a bit of insulated electric-light carbon down near the end, and the boiling point is attained in a matter of three minutes.



BATTERIES IN THE CELLAR WHERE THE ENERGY OF THE LITTLE BROOK IS STORED



MR. FERGUSON, THE ELECTRICAL WIZARD OF VALHALLA, IN HIS WORKSHOP

Bread going into the home-made toaster again merely an encased grid of 12-gage German silver wire—comes out brown and hot in a twinkling.

Eggs are popped into the boiler, of which the metal itself is one electrode and a bit of carbon the other- and in another two or three minutes a close approach to a complete breakfast has been manufactured from the raw materials without moving from one's chair.

There is in contemplation an entire low-tension frying-stewing-boiling-roasting plant which will relegate the present kitchen equipment to the scrap-heap, but the mention of eggs brings us to a further present application of the benevolent little generator.

It is indeed a lucky egg that finds itself laid in the Ferguson hen-houses. Tenderly it is taken into the home, with its prospective brothers and sisters, and deposited in the electrically warmed incubator, the heat of which is so perfectly regulated by a thermostat that the temperature will not wander more than one degree from the desired point.

Hatching over, the chicks pass to an electric brooder similarly safeguarded, and when they have graduated into a presumably chilly world provision is still made for their comfort for among other luxuries of the yard is a cold-proof chicken-house of ice-box construction, with another nicely arranged German-silver coil, which gives the ultra fastidious bird a choice of three temperatures.

While overseeing these automatic performances it is occasionally necessary to call a servant; the trick is accomplished by the usual pressing of a button, but in this case the tiny dynamo is still at it: the insurance companies consider eight volts below the danger point, and even the annunciator system is wired from the power-house.

Again, it may be necessary to solder a joint here and there; if so, Mr. Ferguson's soldering device is at hand. The "iron" consists of an electric-light carbon and—but you cannot blame Mr. Ferguson if he declines to divulge the intimate details of this very clever device, for it is clever and valuable. However, the little arc brings about fusion in a manner as nearly instantaneous as the

eye can catch. There is no waiting for the iron to heat; no tinning of it when heated. The joint has been finished within a very few seconds of starting work -and if it be necessary to pause and smoke between joints the low-voltage cigar-lighter is always dangling conveniently to hand.

Other uses of the little generator's product are to be found about the prem-

COFFEE IS MADE AT THE TABLE BY THRUSTING INTO THE GLASS COFFEE POT AN ALUMINUM TUBE WITH A BIT OF INSULATED ELECTRIC LIGHT CARBON AT THE END. THE BOILING POINT IS ATTAINED IN THREE MINUTES

ises, but these tell the story. It is not the thrilling recital of the discovery of a new electrical principle calculated to uproot science in its present state and close the doors of light-and power companies all over the country; rather is it the plain tale of one man's highly ingenious application of perfectly well-known, perfectly simple electrical knowledge; and being new and ingenious in its working-out, one brands it, at first glance, as impossible.

In the depths of the Adirondack forest, leagues from the nearest dynamo, a certain great man owns a camp. It was suggested by a mutual friend that he

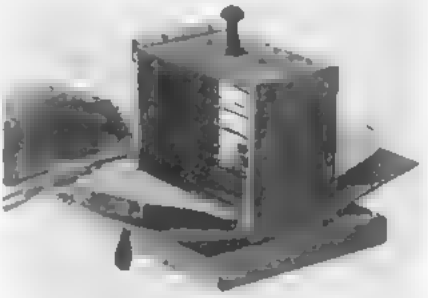
EGGS ARE COOKED IN A BOILER THE METAL OF WHICH IS ONE ELECTRODE AND A BIT OF CARBON. A COMPLETE BREAKFAST IS MADE FROM THE RAW MATERIALS IN THREE MINUTES WITHOUT MOVING FROM ONE'S HAIR

journey to Mr. Ferguson's home and see how easily much may be done with little, in the way of equipping a place with electricity. The visit was arranged, but as the train neared Valhalla the great man said to the mutual friend:

"Frankly, I'm sorry you planned this trip."

The friend was astonished.

"Why?" he asked.



MR. FERGUSON'S HOME MADE TOASTER IS AN ENCASED GRID OF TWELVE-GAGE GERMAN SILVER WIRE. THE BREAD IS TOASTED BROWN AND HOT IN LESS THAN THIRTY SECONDS

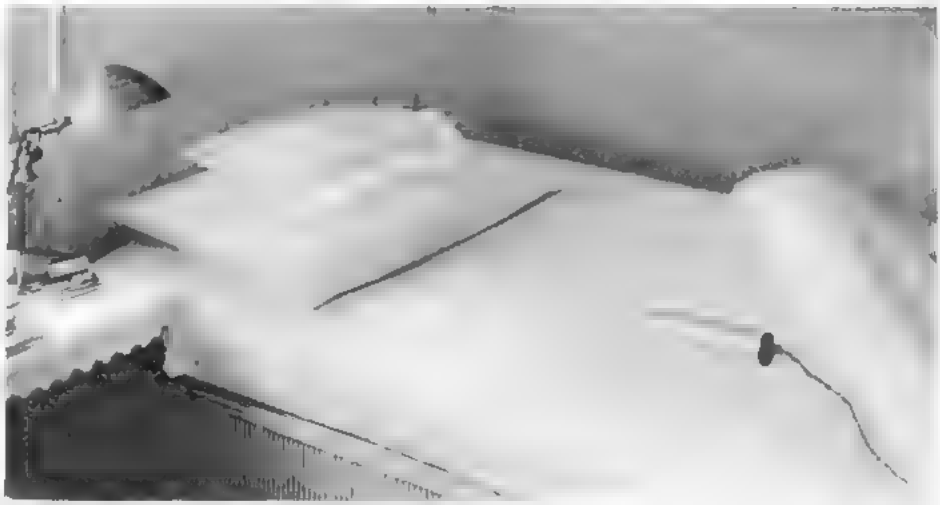
"I'll tell you," said the great man. "You mean well, but you've made a big mistake somewhere about this thing. I told an electrical engineer about it last night — told him just what you told me — and he said that it can't be done."

The mutual friend was silent.

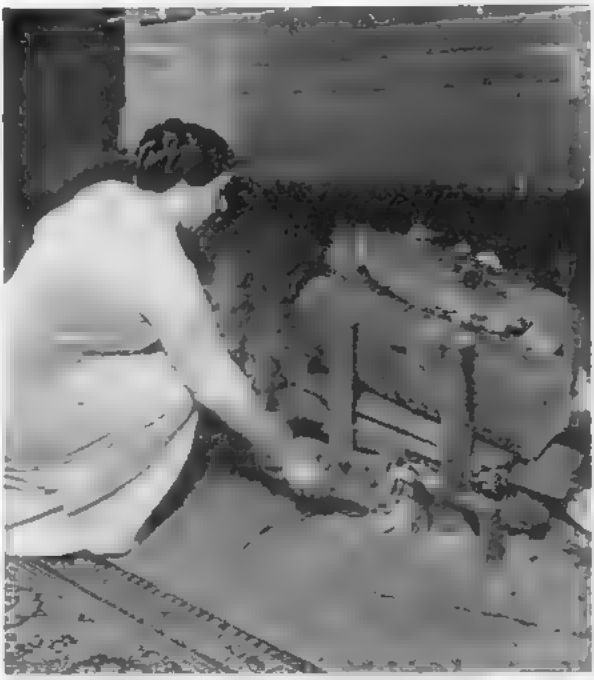
"So don't mind if I laugh. I'll try not to!" concluded the eminent visitor.

Yet when he had inspected the generator, come face to face with electrically warmed chickens, patted the electrically heated bed, watched perfectly genuine lights twinkle in an entirely indubitable

WHENEVER IT IS NECESSARY TO TACKLE A SOLDERING JOB IN THE FERGUSON HOUSEHOLD, THE WIZARD OF VALHALLA'S ELECTRIC SOLDERING "IRON" IS MUSTERED INTO SERVICE. THIS IS REALLY A CLEVER INVENTION, THE DETAILS OF WHICH ARE STILL THE INVENTOR'S SECRET. IT WORKS PERFECTLY, HOWEVER, AND PATENTS HAVE BEEN APPLIED FOR IN EVERY COUNTRY IN THE WORLD



ON CHILLY NIGHTS IN WINTER IT IS ONLY NECESSARY TO TURN A SWITCH WHICH ENLIVENS AN ELECTRIC BED-WARMER—A COIL OF HEAVY GERMAN SILVER WIRE IN A SHEET-IRON CASE AND OUT IN THE SNOW DRIFTED POWER-HOUSE THE FAITHFUL LITTLE GENERATOR DOES THE REST



IN THE FERGUSON HOUSEHOLD MATCHES AND KEROSENE ARE NOT NECESSARY TO LIGHT THE FIRE IN THE FAMILY HEARTH STONE. YOU SIMPLY PRESS THE HANDLE OF AN ELECTRIC FIRE-LIGHTER AND THE KINDLING IGNITES

fashion, and, finally, eaten an electrically cooked meal, the great man sighed pleasantly and demonstrated his real greatness.

"It is wonderful—and this is indeed a wonderful day," he said candidly to the mutual friend. "For, after all the years I have known you, you have finally told the whole truth about one thing!"

Also was there a very eminent inventor and electrical engineer who heard the story of the Valhalla water-wheel and smiled tolerantly, privately pitying the deep ignorance of his informant.

"It is impossible, of course," he commented.

It chanced that the informant was of rather obstinate nature. Having watched the manifestations of the little generator on many, many occasions, he refused to subside and wonder silently how one may create lights and chickens and steaming coffee from pure imagination.

Persistence led to argument, argument to a tour to Valhalla; and before starting the eminent inventor packed up several delicate instruments, which would demonstrate, even to a layman, how thoroughly impossible is the impossible.

Just how the instruments behaved, just what comments the inventor made, have not been passed down to history; but it is a matter of record that the generator worked as smoothly, quite as efficiently that day as on any day before or since, even in the presence of instruments that should have caused it to fuse with hot shame.

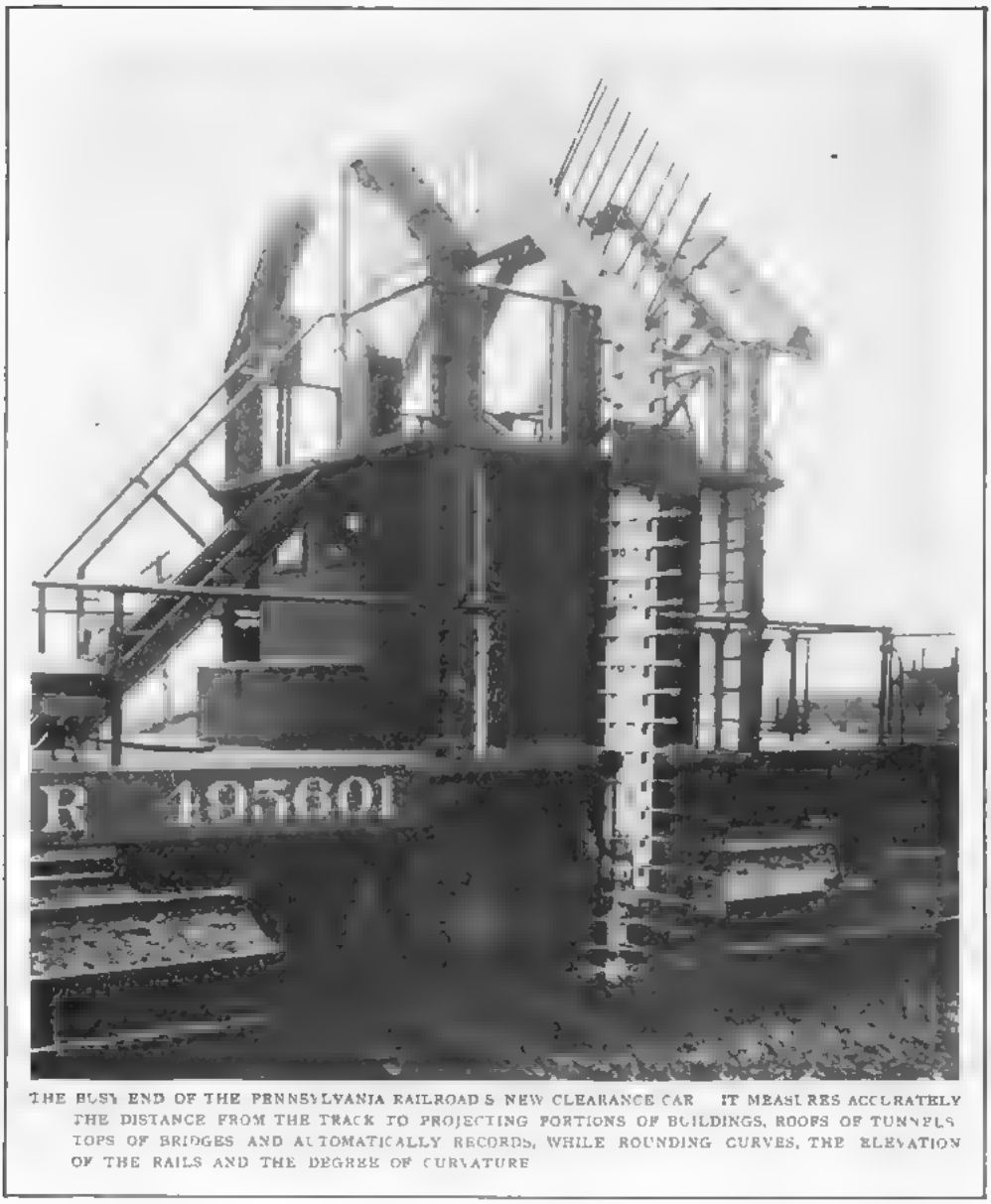
One disadvantage of the system appears in the fact that most of the appliances used are of necessity a long way from the standard voltages. That is balanced by the other fact that whatever apparatus it has been necessary to construct is of such simplicity that literally a few cents and a few hours of labor supply what the manufacturers do not furnish.

Another apparent disadvantage is found in one of the great secrets of the whole efficiency—the practical elimination of line-losses through the use of abnormally big conductors, which allow the whole eight volts to reach the point of utilization.

While No. 2 copper wire may offer a resistance of only .83 ohms per mile, the cost of such a line is likely to appal one, on first thought. Questioned on this score, Mr. Ferguson smiled pensively and produced his pencil for a little figuring. An extra hundred dollars had been spent for wire in the first place, in departing from the standard way of doing things. And in his storage batteries alone a matter of nine hundred dollars had been saved also in breaking away from the standards.

So that it all boiled down to the comment that the running expenses of his electric plant must be about one good-sized can of axle-grease per annum to keep the water-wheel from squeaking.

Again Mr. Ferguson smiled, but there was no need for the pencil this time.



THE BUSY END OF THE PENNSYLVANIA RAILROAD'S NEW CLEARANCE CAR. IT MEASURES ACCURATELY THE DISTANCE FROM THE TRACK TO PROJECTING PORTIONS OF BUILDINGS, ROOFS OF TUNNELS, TOPS OF BRIDGES AND AUTOMATICALLY RECORDS, WHILE ROUNDING CURVES, THE ELEVATION OF THE RAILS AND THE DEGREE OF CURVATURE

THE PENNSYLVANIA'S MOST USEFUL CAR.

FEW American railroads know exactly how much room they have between the rails below and the bridges and tunnel roofs above. In order to find this out the Pennsylvania Railroad has built a "clearance car" which it is running over every division. This measures accurately and quickly the distances from the track to projecting portions of buildings, the roofs of tunnels, the tops of bridges, and other structures on or near the rails. This clearance car also indicates automatically while moving on curves the elevation of the rails and the degree of curvature.

The car is a steel flat car 54 feet 8 inches long, or 30 feet between truck centers. Its floor is 4 feet 5¼ inches above the top of the rail. At the clearance frames is an elevated platform,

5 feet 2¼ inches above the deck. This is for the use of the observers in reading the upper scales.

The fixed clearance frame is mounted over the truck. It carries hinged fingers each two feet long and spaced six inches apart. In any angular position these show directly on a scale their net projection beyond the frame. A small loose board, with feeler fingers an inch apart, is provided for attachment anywhere along the frame. This is to measure the clearance outline at cornices of shelter sheds or other irregular objects close to the track

Forward of the main clearance frame is another frame having the same outline, but capable of being raised and lowered in a vertical hollow shaft. The main frame measures the normal clearances up to 17 feet above the top of the rail. The sliding frame is used for bridge clearances above 17 feet and up to 20 feet. All the fingers have enough friction on their hinges to stay in any position to which they are deflected.

All the frames are illuminated by belts of incandescent lamps set in housings with a translucent glass front facing the frame. Attached to the feelers and the side of the templet are graduated scales which indicate automatically the distance from the rim of the templet to a side or overhead object.

As the car passes over a curve an attachment on the rear truck indicates the degree of curvature on a scale. There are two of these scales in a small cabin in the middle of the car, facing the clearance frames. Pointers indicate respectively the curvature in degrees and the elevation in inches.

In this cabin also is an instrument consisting of a long pendulum suspended vertically. This indicates automatically the elevation of one rail of the track over the other. The side of this cabin facing the main templet is provided with a window which enables the operator to read the degree of curvature and the elevation of the rail at any time.

All the attachments work automatically, and it is possible to take clearance measurements while the car is running at a speed of four miles an hour. Measurements can be taken day or night or in the darkness of tunnels, owing to the ample illumination of the gages.

As a rule it takes only two men to operate this new clearance car. One takes the readings of the scales and the other records them. Where clearances are close and irregular, however, it takes three men.

DIVING 120 MILES AN HOUR IN A BIPLANE.

THE sensation of recent aviation has been the flying of M. Chevillard on the 80-horse-power Henry Farmans at Hendon, England. He is one of the few men who still does the spiral dip, or the "dip of death," as it is known in this country. Chevillard performs the feat as follows

The first thing he does is to throw the control-lever to the left, thus banking the machine upon the right, at the same time pushing the lever forward to get the nose of the machine down. Immediately the machine begins to dive he brings the ailerons back level by centralizing the levers, gives full rudder to the left with the left foot, thus increasing the bank, and almost simultaneously he pulls the lever back as far as it will go, thus pulling the elevator up.

The effect of this is that owing to the steep bank the rudder acts as an elevator and keeps the tail up, while the elevator acts as a rudder and keeps the machine turning in a small circle, so throwing it out against the air by its own centrifugal force. At the moment of beginning the maneuver, Chevillard switches off, apparently with the idea of removing most of the gyroscopic force of the engine, and so making the machine quicker in answering its controls. As soon as it starts on the spiral he switches on again, so as to have the engine ready to steady the machine in flattening out.

The performance would be impossible on any machine which had not a very large tail and elevator situated on a level with the top plane, because it is highly probable that in the ordinary type of tractor biplane, when the machine really began to dive at a speed of about 120 miles an hour, the stream lines from the fuselage and the deflection of air by the upper plane would so upset the controls that they would refuse to act.

GIVING THE GODDESS HER ANNUAL BATH.

WASHINGTON might be called the core of national interest. It is the capital of the nation, and for this reason peculiarly the events of Washington influence the world. The activities of States seem rather insignificant in comparison. In Washington the most potent of our legislation is enacted; our relations with foreign countries is determined; appropriations are made for big steps in our progress; there government officials manage our money, which is the very essence of commerce and industry; in fact, Washington virtually controls our welfare.

It is a city of big things. Visitors to Washington look for the big things only, and most of them know nothing of the interesting little things. The Capitol is a large, imposing structure that crowns a hill facing Pennsylvania Avenue. Other important buildings attract the tourist, but in the Capitol lies the center of greatest interest, because there it is that our federal legislators meet.

ONCE A YEAR FIFTEEN MEN CARRY TIMBERS TO THE DOME OF THE CAPITOL AT WASHINGTON, GIVE THE GODDESS OF LIBERTY A GOOD SCRUBBING AND PAINT THE GREAT DOME GRAY

The dome of the building is lofty and beautiful. Seen from the interior, probably nothing similar is quite its equal. The exterior offers an interesting little story that is known to few. Once a year the Goddess of Liberty—the big statue which tops the dome—and the dome itself are given a housecleaning. The statue is scrubbed till it is glistening and the dome is painted gray.

There being no elevators leading up into the dome, it is necessary to carry all the scaffolding to the statue by hand and set it in place.

The work is done quickly and, despite the danger of working on the open scaffolding, it is said that no serious accident has ever occurred to the workmen.

Another rather curious feature of the capitol is the fact that as it faces the city to-day it is turned around. When it was constructed it was thought that the region lying to the south would be the section to really develop into the greater half of the city, but strangely the real growth took place in the north, where the city's finest buildings and residences are now situated.

THE ART AND STEREOTYPING ROOM OF THE GLACIER PARK BLAZER WHICH OCCUPIED HALF OF AN ORDINARY BAGGAGE CAR

FIRST DAILY NEWSPAPER PRINTED ON A TRAIN.

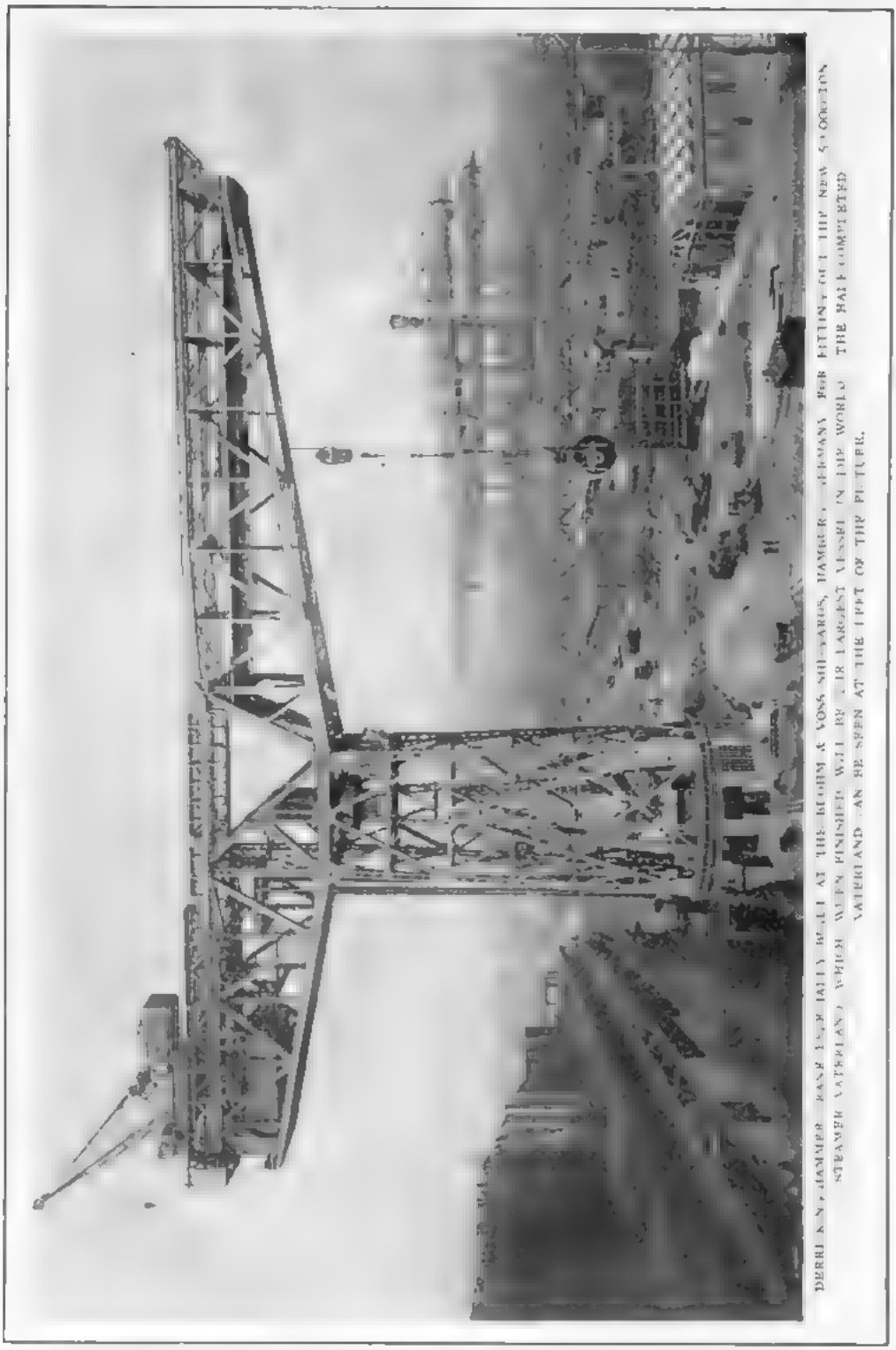
FOR the second time in the history of railroading a newspaper has been printed on board a train. Thomas Edison, the electrical genius, was the first man who accomplished this feat in publishing. As in countless other things, he did it successfully. It was the beginning of his wonderful career. Employed as a newsbutcher, he realized the possible financial return from the interesting gossip that he picked up along the route of his train. So he started a weekly. His press, type, and other equipment were carried on the train, and once a week young Edison issued his paper and sold many copies to passengers, who were probably more inclined to encourage the young man than to find any great interest in the contents of his paper. It was a small venture, but it was distinctly typical of the man. It was an innovation, and Mr. Edison is unquestionably one of the premier innovators of the world. The second instance of publishing a newspaper on board a train occurred during the recent tour of a large automobile association. The Great Northern Railway equipped a luxurious hotel train, which followed the itinerary of the association and afforded accommodation to the association's members. Once a day for a week the *Glacier Park Blazer* was issued. In this regard it took precedence over Mr. Edison's paper, which was a weekly. A car was fitted with a cylinder press, a linotype machine, and a complete art and engraving outfit. An electric plant supplied the necessary power. For seven days the tourists were supplied with items of interest

HEADING OF THE FIRST DAILY NEWSPAPER EVER PRINTED ABOARD A RAILROAD TRAIN

"SETTING UP" THE NEWS OF THE DAY ON A LINOTYPE MACHINE RIGGED UP AT ONE END OF THE CAR

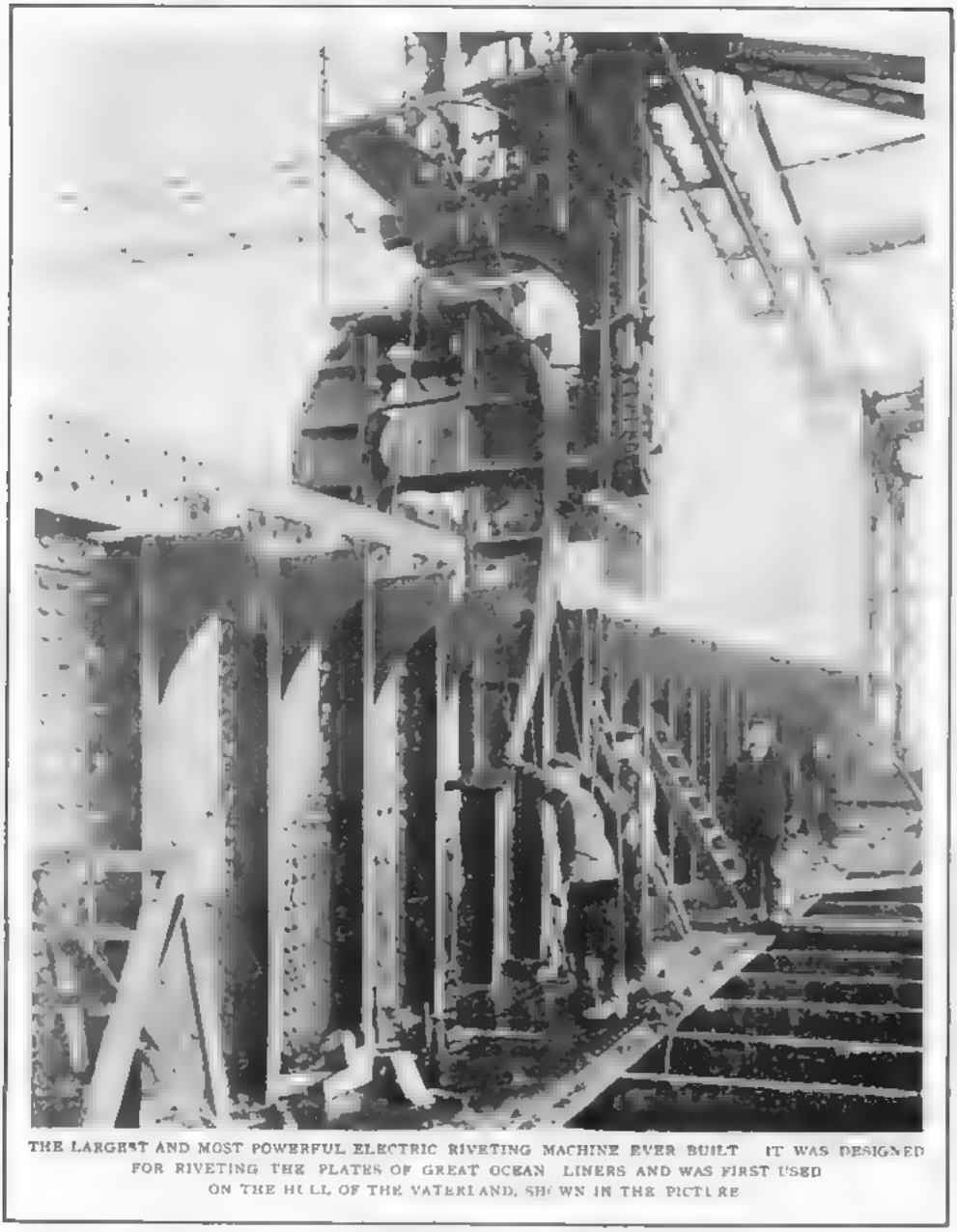
TYPICAL CASES WHERE THE NEWS IS SET UP AND THE PRESS THAT RAN OFF THE EDITIONS

GIGANTIC MACHINERY NECESSARY TO BUILD



DERRICK AND HAMMER USED IN THE BUILDING AT THE BLOHM & VOSS SHIPYARDS, HAMBURG, GERMANY, FOR FITTING OUT THE NEW STEAMER VATERLAND, WHICH WHEN FINISHED WILL BE THE LARGEST VESSEL IN THE WORLD. THE HAMMER AND DERRICK ARE SEEN AT THE LEFT OF THE PICTURE.

THE NEW 50,000-TON STEAMER VATERLAND.

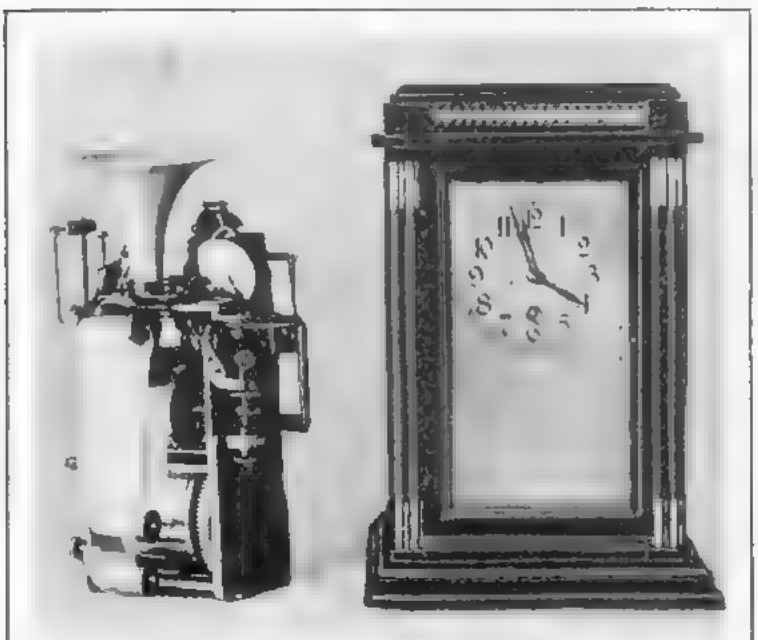


THE LARGEST AND MOST POWERFUL ELECTRIC RIVETING MACHINE EVER BUILT IT WAS DESIGNED FOR RIVETING THE PLATES OF GREAT OCEAN LINERS AND WAS FIRST USED ON THE HULL OF THE VATERLAND, SHOWN IN THE PICTURE

IN the shipyards of Blohm & Voss, Hamburg, Germany, the giant crane shown on the opposite page was especially erected for use in fitting out the Vaterland, which, when finished, will tower above all the other leviathans in length, bulk, and speed. The crane is the largest and most powerful lifting machine in the world It is known as a derricking-hammer crane, with a lifting capacity of 500,000 pounds. On this page we reproduce a close view of the electric rivet and welding machine for joining the plates of the big steamer This huge hammer is operated by electricity. It is the largest of its kind in

the world The new steamship Vaterland, of the Hamburg-American Steamship Company, was launched at Hamburg April 3, the greatest mass of steel ever put into the water. The vessel's launching weight was 31,000 tons, and her gross tonnage will be over 50,000 tons. She will be 950 feet long and 100 feet wide, and her height from keel to masthead will be 250 feet. The vessel will be 5,000 tons larger than the Imperator, her sister ship, described in the August RAILROAD AND CURRENT MECHANICS. The Vaterland will not be ready for service until 1914. This vessel will have searchlights of 80,000 candle-power, and the light will be placed high enough to throw its rays thirty miles. The Vaterland will have eighty-four lifeboats, two of which will be equipped with high-power motors capable of towing other boats. These motorboats will have wireless telegraph apparatus, with which messages can be sent 200 miles. She will be supplied with a double hull.

GERMAN INVENTS CLOCK THAT TALKS.

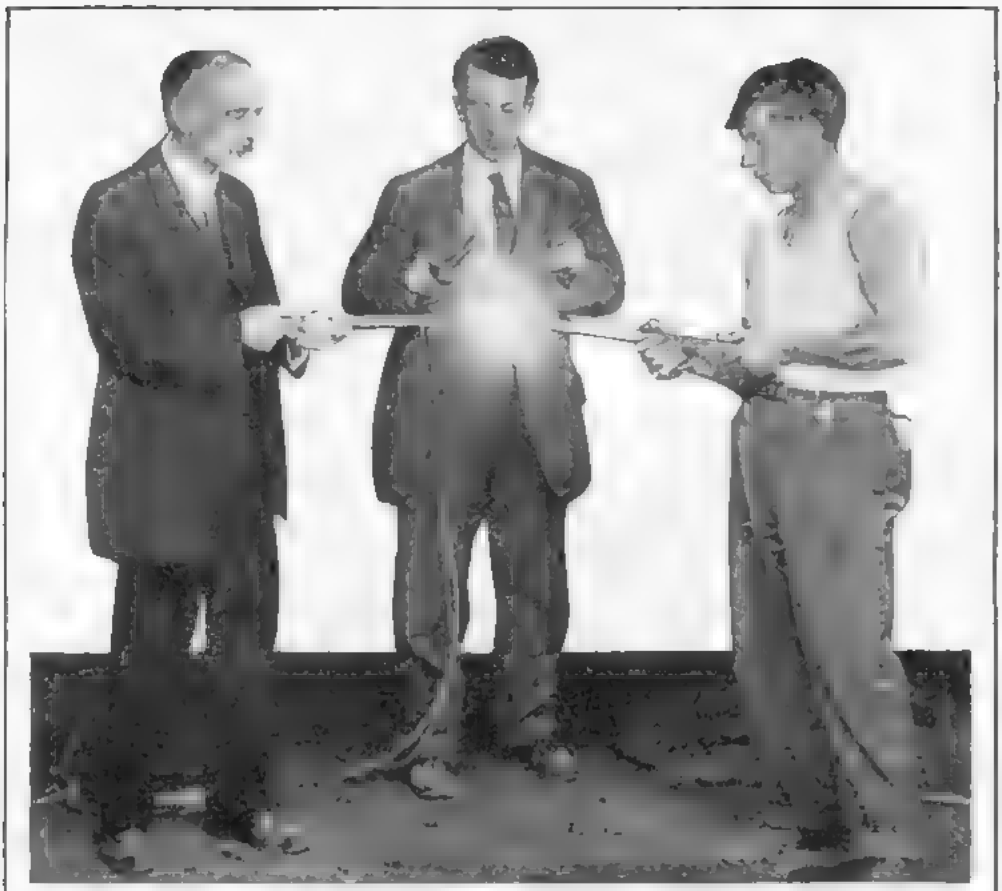


THE PHOTOGRAPH ON THE LEFT SHOWS THE WORKS OF THE TALKING CLOCK THE ROLL WHICH CONTROLS THE PHONOGRAPH AND THE FUNNEL THROUGH WHICH THE TIME IS REGULARLY ANNOUNCED AS IF A HUMAN BEING WERE SPEAKING. THE PHOTOGRAPH AT THE RIGHT SHOWS THE CLOCK AS IT APPEARS WHEN COMPLETE.

Photograph by Paul Thomtson, New Y[illegible]

INVENTORS do many remarkable things with clocks, but the latest novelty in timepieces is an ingenious invention that talks. It is not particularly garrulous, nor does it indulge in gossip. Its business has to do with time, and that is the only thing it talks about—it announces in a nicely modulated tone the hours and quarter-hours, and does not rend the small hours of the night by striking. It is the invention of a German machinist named Heinrich Markus. It consists of a combination of a phonograph and the ordinary works of a clock By attaching a small roll to the bar which turns the hands the action of the phonograph is so controlled that it operates only when the hands reach the hour and the quarters. A small spring releases the phonograph, which is small, of course, and carries only a diminutive record, and the machine tells the time. If necessary, it can be switched off during the night if one fears that the sound might wake him, thus preserving silence save for the soft ticking. The exterior and works are shown herewith

Several parts of the interior are made of aluminum to secure lightness. The exterior is made of polished mahogany with burnished gold trimmings of a neat, plain design.



WELDING TWO HARD STEEL FILES 1½ INCHES IN THICKNESS BY THE OXYACETYLENE PROCESS. THE WELDING WAS COMPLETED IN JUST 5¾ SECONDS. THE MEN HOLDING THE FILES STATED THAT THEY FELT NO HEAT. THE MAN APPLYING THE FLAME HOLDS IN HIS LEFT HAND A STICK OF ALLOY WHICH IS FED TO THE MELTING METAL TO ASSIST THE ANNEALING

THE WONDERS OF THE VIOLET BEAD.

W. W. VON TODENWARTH, manager of the Atlas Welding Works at Rahway, New Jersey, placed on an iron table two circular rods over an inch in diameter, with the ends touching. One of the rods was cast iron and the other chilled steel.

"Now watch," said Mr. von Todenwarth, as he toyed with the gage-cocks of several gas cylinders and straightened out two tangled rubber tubes connecting with a brass nozzle.

He turned the little faucet of the nozzle and a soft hissing of gas followed. He lit a match and applied it to the nozzle-tip. Immediately a violet jet of flame about five inches long burst forth. Close to the right of the nozzle there appeared a peculiar bead of fire of a noticeably violet hue, too luminous for human gaze.

Mr. von Todenwarth applied the violet bead to the end of the steel rod which projected over the table. In a flash the rod caught fire and began to burn like a piece of paper, emitting as it burned a shower of sparks. The bead was then moved along the rod, which it sliced with the ease of a knife cutting butter.

Then Mr. von Todenwarth brought the purple bead to the adjoining ends of the iron and steel bars. In the astonishing space of six seconds the metals melted and fused into one another. The

violet bead was removed. Three or four seconds elapsed. The bars were lifted and were found to be welded as rigidly as if they had originally been a piece of solid metal

This shows how quickly and thoroughly hard metals can be welded by the inconceivable oxygen-acetylene blow-pipe.

"The violet bead gives out a heat of 6,900 degrees," explained Mr. von Todenwarth. "The rest of the flame is in the neighborhood of 4,000 degrees."

Asbestos Cannot Resist It.

"Can any known substance resist the maximum heat?" asked the writer.

"Nothing. The most refactory elements or compounds are either oxydized or dissipated altogether. Even asbestos is turned into a shrunken, bubbly mass."

"If that's the case, how do you manage to use brass nozzles?"

The manager wiped his forehead a trifle wearily, as one is apt to when answering a fool question.

"The force with which the gases - the oxygen, especially issue from the nozzle blows and keeps the bead away from it. If you look closely you can see the space between the metal and the flame."

Sure enough, there was a dark band about one-sixteenth of an inch between the violet brilliancy and the blackened brass.

"The idea of using the heat of burning gases to fuse and weld metals is not altogether a new one," said Mr. von Todenwarth. "The acetylene process dates back some eight or nine years; the method employed to-day is very different, however. Welding that wears is dependent on the alloys used. My belief in this respect has resulted in my inventing a series of metallic alloys.

"Every job requires an alloy that shall be suitable for the metal that is to be repaired. The alloy must be of a nature that shall meet the demands made upon it by the machinery of which it becomes a part. The temperatures to which it will be subjected must be carefully considered, as must the strain to which it is put. The annealing of the mended part may take anywhere from three to seventy-two hours, according to the nature of the fracture and the size of the weld. After that, the weld is "trued up" to its proper dimension with file or lathe. We guarantee the finished work to be from thirty-five to fifty per cent stronger than the surrounding parts.

"There is 1,900 pounds pressure to the square inch in the oxygen and 6 pounds in the acetylene tank. From the tanks the gases are led into the mixing chamber; the oxygen, in the meanwhile, being reduced to about thirty pounds' pressure. The acetylene stands at its original pressure. Why the difference in the two pressures? There are several reasons. One is an excess of oxygen that is needed in order to bring about the intense incandescence of the atoms of carbon contained in the acetylene. Then, again, there must be sufficient blow or pressure to keep the bead from touching the nozzle."

He turned the faucet of the nozzle that admitted the acetylene to the blow-pipe and lit the stream of gas that followed. The long jet of flame had a smoky tip that blackened a piece of white asbestos sheeting.

"There's the carbon that does the trick with the help of the oxygen," he remarked, pointing to the flame tip. "In the bead every particle of that soot is heated to the highest possible point. It isn't alone in welding that superheated carbon plays a prominent part. The acetylene light itself, with the aid of a special form of burner, borrows its brilliancy from it; so does the arc light, the so-called lime-light, and even gas mantles are based on the same principle.

Action of the Ignited Gases.

"This violet bead will cut through nine inches of the hardest metal. In order to do this, however, we have not only to use oxygen of high pressure in conjunction with the acetylene, but, in addition, we have an auxiliary nozzle playing on the part under treatment. The oxygen pressure, in such cases, may range from 200 to 250 pounds per square inch.

"The action of the ignited gases is this: the bead raises the metal almost instantly to the melting point. The super pressure of oxygen acts on the melting metal, oxydizing and dissipating it in a clean thin line.

"When we get to the nine-inch limit or a trifle below it, the metal begins to take up or absorb the heat of the bead, and the oxygen in consequence cannot do its work. So far, science has failed to devise a plan for maintaining the necessary degree of heat beyond the nine inches.

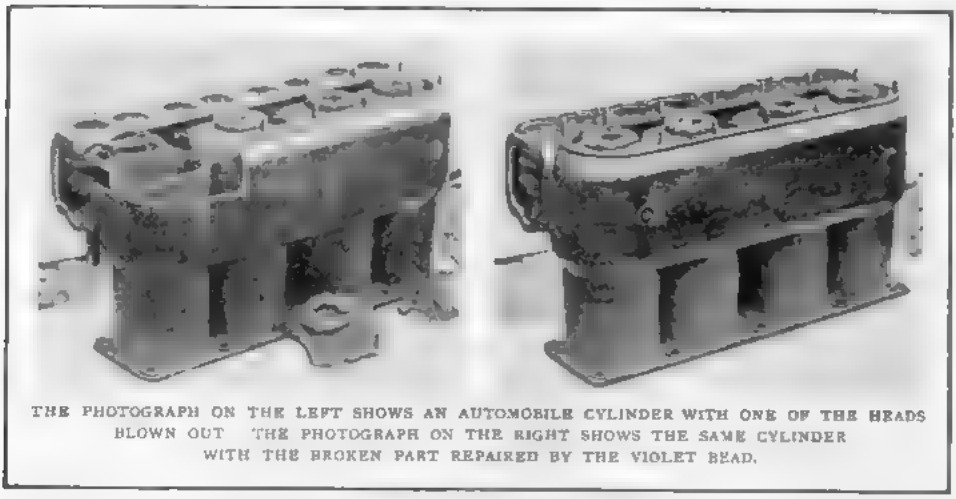
"In a lesser degree the same kind of thing takes place when we are working at the ordinary pressure of thirty pounds of oxygen and four or six of acetylene. The flame forward of the bead keeps the metal heated to such a degree that permits the oxygen to act on it. This is the explanation of the entire process; but skill is required in the adjustment of the gas-jets. A fraction too much oxygen or acetylene, one way or the other, and you have a spoiled job on your hands.

"There really doesn't seem to be any reasonable limitation to the scope of the process, except in the depth of cutting.

"Steel, cast iron, aluminum, brass, copper, platinum, and, in several instances, metals that are foreign to each other, are easily welded. We have accomplished the allegedly impossible task of welding cast-iron to manganese steel. We have mended or built up nearly all kinds of machinery and broken parts, from a cog-wheel whose teeth have been 'chewed off' to the side-works of a locomotive that came out second best in a side-swipe.

"A recent job was the welding of the impeller of the starboard pump of the United States dredging steamer Gedney, now lying at Newport, R. I. The service to which these pumps are subjected is very severe, and is a test of the wearing ability of the welds made by the oxygen-acetylene process. On the same steamer we closed a large sand-hole in the port pump shell. This shell has to endure the scour of the sand for hours at a time.

"One of the advantages of the process



THE PHOTOGRAPH ON THE LEFT SHOWS AN AUTOMOBILE CYLINDER WITH ONE OF THE HEADS BLOWN OUT. THE PHOTOGRAPH ON THE RIGHT SHOWS THE SAME CYLINDER WITH THE BROKEN PART REPAIRED BY THE VIOLET BEAD.

is its handiness. If the need arises, the apparatus can be easily transported to the scene of the breakdown and repairs of a temporary or permanent nature can be made there. Recently the fire-box of a big steam-shovel belonging to the Pennsylvania Railroad, that was making a cutting about thirty miles from Rahway, broke in two. We rushed men and gas-cylinders to the disabled shovel. In a couple of hours it was in working order again. Later, of course, the break had to be given effective annealing treatment, but it proved the value of the process in times of emergency.

Welding Hard-Steel Files.

"The process is especially serviceable for welding new parts in large or small boilers or filling cracks in them. Then, too, it adds metal to parts that are subjected to friction, tool steel to common steel; welds flanges on pipes, replaces missing parts; joins steel parts for reinforcing of concrete, and—but what's the

use of telling more about the usefulness of the tiny violet spark?

"Let me sum up the whole business by declaring that the mechanical world is only beginning to realize its importance and its possibilities. A few years hence and we shall be wondering how ever we managed to do without it."

Mr. von Todenwarth called attention to the curious manner in which the bead seemed to concentrate its heat on the spot on which its energies were brought to bear

"This is due to the intensity and rapidity with which it does its work," he explained. "In consequence, it seldom radiates heat to more than a comparatively slight extent. A bar of metal that is being cut by the inconceivable temperature at which it works is quite cool a couple of inches or so away from the bead. Let me give a demonstration."

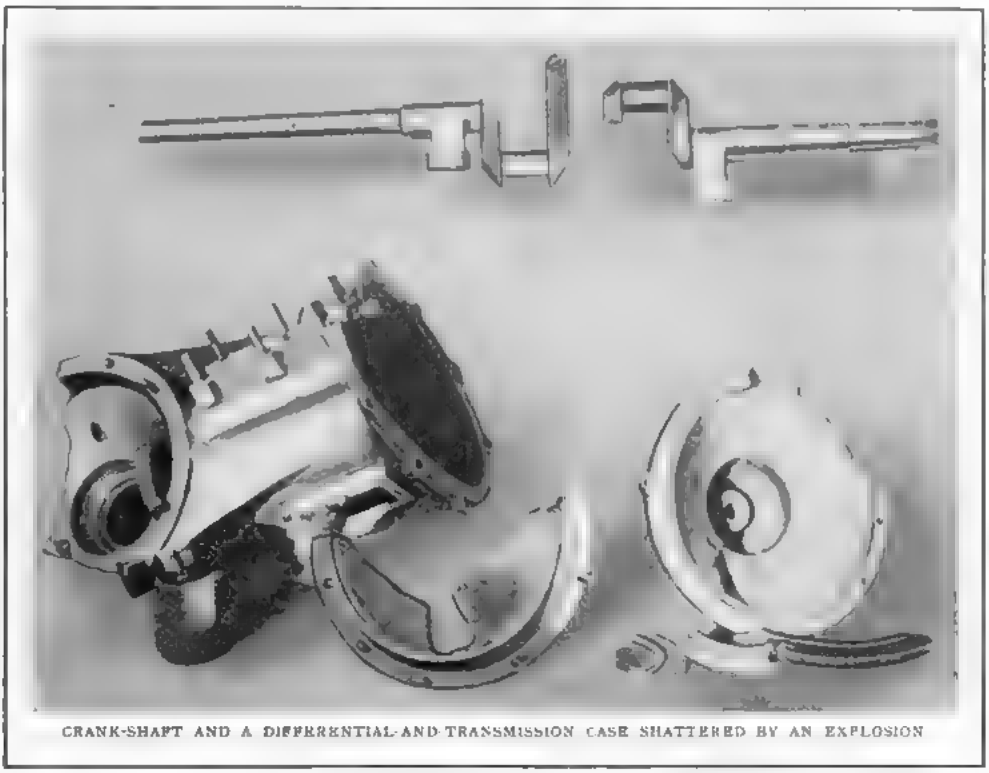
He asked an assistant to fetch a couple of hard-steel rods, each about two feet in length and about one and a half inches in diameter. The writer took one of these bars, the assistant the other.

"Touch the inside tips of the bars," said the manager

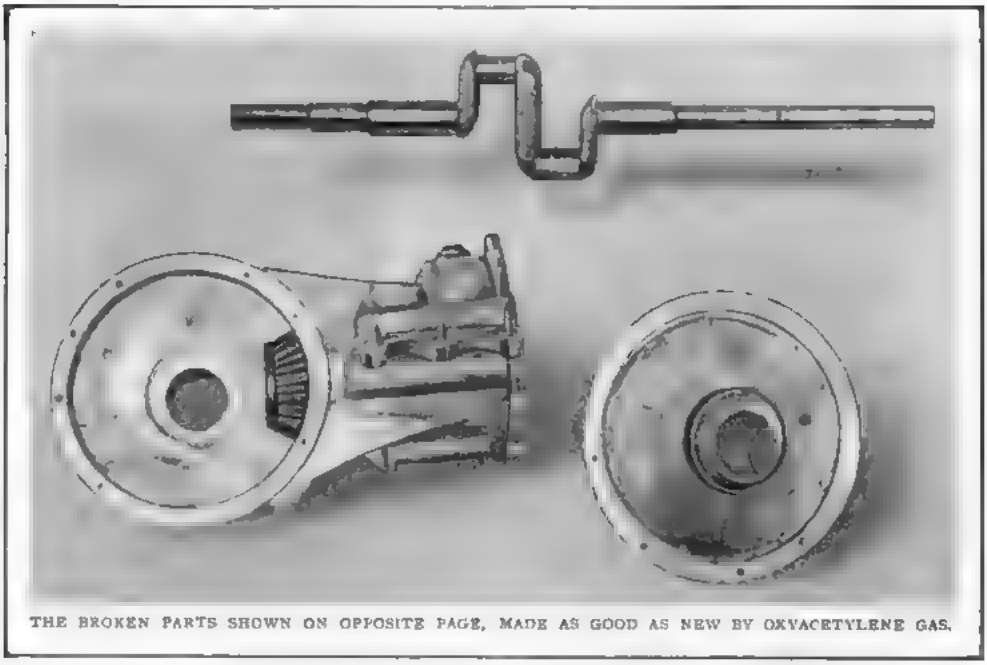
A moment of manipulation with the faucets of the blow-pipe and lighting the jets of gas—then the bars at the point of juncture grew suddenly red, changed instantly to dazzling white, and finally shimmered with colors of an opal.

Von Todenwarth removed and extinguished the bead. The bars were in one piece. There was no apparent rise in the temperature of those portions of the bars on which the hands of the two men rested, although, a *few inches* distant, nearly 7,000 degrees Fahrenheit had been in operation!

The welding is usually done in the following manner: a V-shaped channel is cut through the fracture, from one side to within one-thirty-second of an inch of the other side. The bead is now brought to bear on the cut until the two edges begin to flow. The alloy is melted in until the V-space is filled to running over. The annealing process follows after due consideration of the strains to which the part is subjected.



CRANK-SHAFT AND A DIFFERENTIAL AND TRANSMISSION CASE SHATTERED BY AN EXPLOSION



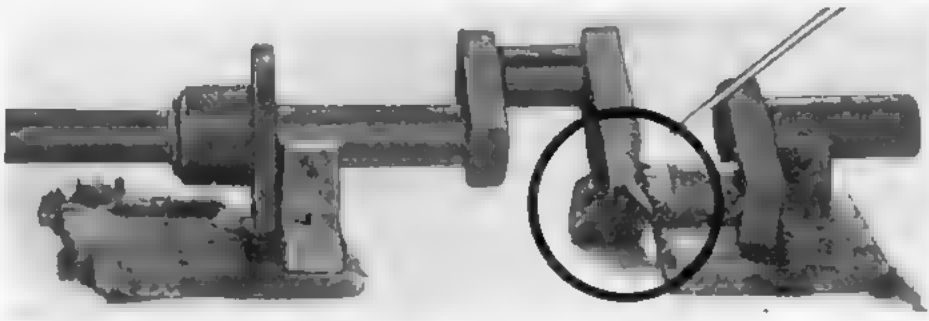
THE BROKEN PARTS SHOWN ON OPPOSITE PAGE, MADE AS GOOD AS NEW BY OXYACETYLENE GAS.

"There is a form of welding in which the surface of the fracture is melted and veneered with metal," concluded the manager. "I needn't tell you that such work doesn't last. To effect a proper weld one must not only match the alloy to the parent metal and properly temper the finished work, but, in addition, he must use an exact combination of the two gases. If the mixture has an excess of one gas or the other the oxydizing or carbonizing of the metal is bound to result and the operation is a failure."

One of the most obvious uses for autogenous welding by means of the oxyacetylene process is the repair of steam boilers. Cracks can be welded up, patches welded in, corroded plates can be built up to their original section or made thicker if desired. Cracks from rivet holes and between rivet holes can be welded up. Landing edges reduced by repeated calking can be built up as desired. Cracked door frames can be replaced by plate construction. Broken mud-rings can be welded up. Cracked tube plate bridges can be made solid again and numerous other defects corrected with the least possible delay and expense. The process compares very favorably in both directions, with boiler shop methods of repairing, and the results are infinitely superior, says Henry Cave, president of the Autogenous Welding Equipment Company, in *The Boiler Maker*.

It has been repeatedly shown that welds under the proper conditions can be carried out so that the weld is as strong as the rest of the material, and will have a satisfactory elongation under test, and if this could be depended upon, as it assuredly could under the above conditions, there would be no reason why rivets should not be practically eliminated in the construction of steam boilers, all the seams being welded. That this would be a great advance over existing conditions can be understood when it is realized that at least seventy-five per cent of the troubles to which steam boilers are heir are due to the riveted seams.

The lap-joint destroys the true circle and produces irregular strain. The butt strap eliminates flexure and produces cracks. The double thickness of metal interferes with the conductivity of the heat and produces trouble with the seams. The nature of the seam causes cracks from the rivet holes or between them. The boiler is only held tight by a thin film produced by calking; any distortion will cause this to be disturbed



A CRANK-SHAFT, BROKEN IN TWO PLACED IN POSITION TO RECEIVE THE VIOLET BEAD AND THE METALLIC ALLOY. THE ROD POINTS TO THE BROKEN PART IN THE CIRCLE

and produce a leak, and the leak frequently produces corrosion.

The strength of a riveted seam under the best conditions is less than that of the original plate, and as the report of the Department of Commerce and Labor on oxyacetylene welds shows that welds can be made so that when the piece is pulled it will break right away from the weld. This would indicate that when the weld is carried out in the proper manner the strength would be considerably superior to that of a riveted joint, thus producing a superior structure. By the three-certificate system the scope of repair work would be considerably broadened with advantage to all concerned, and the elimination of rivets would only be dependent upon the development of the skilled welder.

A CURRENT LOVE AFFAIR.

BY JOHN LAURENCE McMASTER.

IT chanced by strange fashion that I overheard
The tender love musings of Miss Dyna-Mo,
As in a low voice by the motor's hum blurred
She audibly mused while the night lamps burned low

"Ah me," she was saying while *brushing* her *coil*,
"I *watt* not indeed how to answer his plea,
For though *armaturish* (amateurish) in my round of toil,
I'm sure he is *positive* in seeking me
I doubt not my present *attraction* at *joule* (all),
Nor that he is able to give me a *'ohm* (home),
But later another's more ec-*static* call,
I am much a-*farad* (afraid) may cause him to roam

Though I am magnetic, he's apt to re-*volt*
From any restraint that his freedom may mock
Or else like a *flash* in hot anger may *bolt*,
Which would indeed cause me a terrible *shock*
Yet still these misgivings may never *am-here* (appear),
To disturb the course of domesticity
And since I'm convinced to the *core* he's sincere,
I'll claim him as my own Elec-Tri-ty"

Then I woke from my nap with a most sudden start,
For the foreman approached—how I do hate that lout—
So what then became of this matter of heart,
Or of current events, is for you to find out

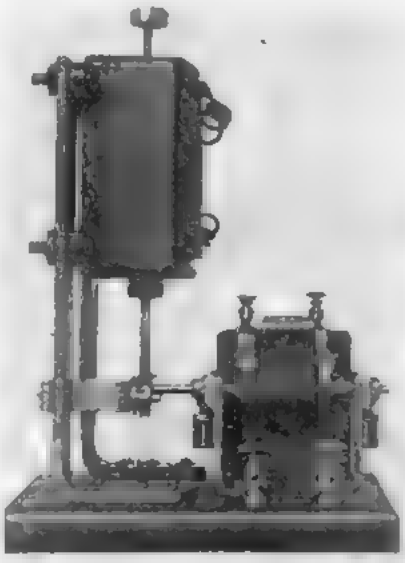
NECESSITY THE MOTHER OF TRANSPORTATION.

NECESSITY is not alone the mother of invention she has another child—transportation. Just what men will do to move about with as little bodily effort as possible is shown in the accompanying pictures. The upper picture shows the strange contrivance of a man obliged to walk four miles for his mail and household supplies. In warm weather the jaunt was tiresome, so with the crude means at hand he constructed this freak three-wheeled affair It includes an ordinary wooden wagon-wheel, a light steel-spoked wheel from an old-fashioned velocipede, the front or steering wheel from a small tricycle, and an ordinary wooden shaft, on which the seat, taken from a bicycle, is supported The steering handle and pedals were also home-made. It was not a record-breaker for speed, but it did save a great many steps. The lower picture shows a curious instance of overcoming a balky horse that refused to drive with the wagon in back of him. He was docile and responded readily to the reins when hitched up the wrong way

WHEN ONE OF THE BIG WHEELS BROKE AN ORDINARY CART WHEEL TOOK ITS PLACE AND THE MAN WHO PEDALS THE MACHINE CLAIMS IT WORKS JUST AS EASILY

THIS HORSE DID NOT LIKE THE ORDINARY RUNNING METHOD OF PULLING A SULKY BUT WHEN HITCHED IN THE SHAFTS TAIL FIRST, HE COVERED THE GROUND IN FINE STYLE

WIRELESS-CONTROL SAFETY-STOP FOR TRAINS.



THE RECEIVING APPARATUS OF THE CANADIAN PACIFIC'S WIRELESS SAFETY CONTROL. SO LONG AS THIS IS KEPT SILENT BY THE CURRENT TAKEN UP FROM THE TRACK CIRCUITS THE TRAIN MAY SAFELY PROCEED

SINCE May, 1911 the Canadian Pacific Railroad has been conducting a series of exhaustive tests of a system which will stop a train when there is danger ahead by means of a wireless electrical device. This is the invention of Frank W. Prentice, a C. P. R. despatcher. In view of the remarkable results of recent demonstrations of the system it is prétty safe to say that Mr. Prentice has a device that is worth noticing.

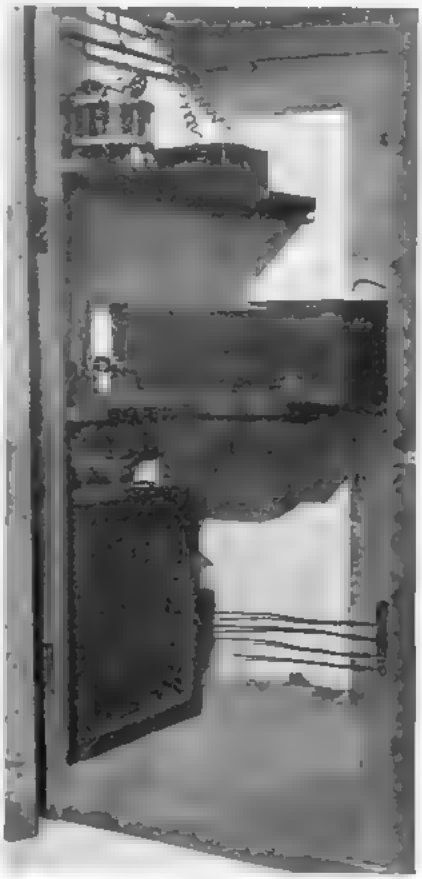
The experimental installation covered two miles of double-tracking, divided into six blocks, each from 2,500 to 3,000 feet in length. At the end of each block were wireless wave generators and transformers that raise the current from 110 to 22,000 volts, controlled by alternating current and relays

The wire that gives out the wave is contained in a wooden trunking laid between the rails. The receiving apparatus on the locomotive is located below the running-board. It consists of a rotating coherer that "grips" the wave, a train-line valve, and a whistle. The last named two are controlled by the coherer.

Beneath the engine are receiving antennæ connected with the coherer and suspended six inches above the wooden trunking. When the block ahead is safe the wave from the trunking is continuously taken up by the antennæ and the apparatus remains quiescent

But when a train enters a given block it immediately puts into action the danger signal to the rear and the device on the locomotive of the train behind gets busy.

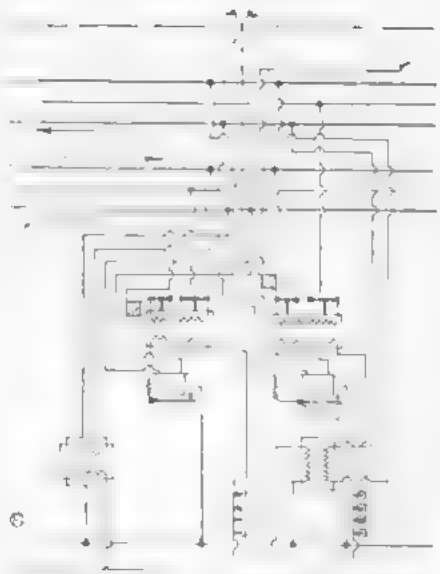
Three seconds later the air whistle on



ONE OF THE WIRELESS GENERATORS SITUATED AT THE END OF EACH BLOCK. THIS GENERATOR IS CONTROLLED BY ALTERNATING TRACK CURRENTS, AND IF THE BLOCK AHEAD IS CLEAR IT PRODUCES THE SAFETY WAVES.

the engine of the second train shrieks a warning to everybody concerned. Three seconds more elapse and the brakes are automatically applied to the train. Another brief respite and engine and cars are brought to a complete standstill.

When the whistle gives the preliminary alarm the engineer, if he so wishes, can press a button in the cab that will prevent the application of the brakes; but his whistle will continue to blow a warning so long as the block ahead is occupied by another train. Aside from the button, the system works independently of human interference or control, which is the intention of the inventor.



THE ANTENNÆ IN THE WIRELESS GENERATOR WHICH RECEIVE THE CURRENT FROM THE TRACK CIRCUITS AND MAINTAINS THE GENERATION OF WAVES UNTIL IT IS NO LONGER SAFE FOR A TRAIN TO PROCEED

In the final test of the system a train traveling at the rate of forty-five miles an hour between North Parkdale and West Toronto was brought to a complete standstill within a very short time of entering a wireless block. The engine had its throttle wide open and the steam-gage was registering a pressure of 190 pounds. Engineer Hallan, according to instructions, was standing in the cab with his hands in his pockets. The locomotive was No. 798 and weighed close on

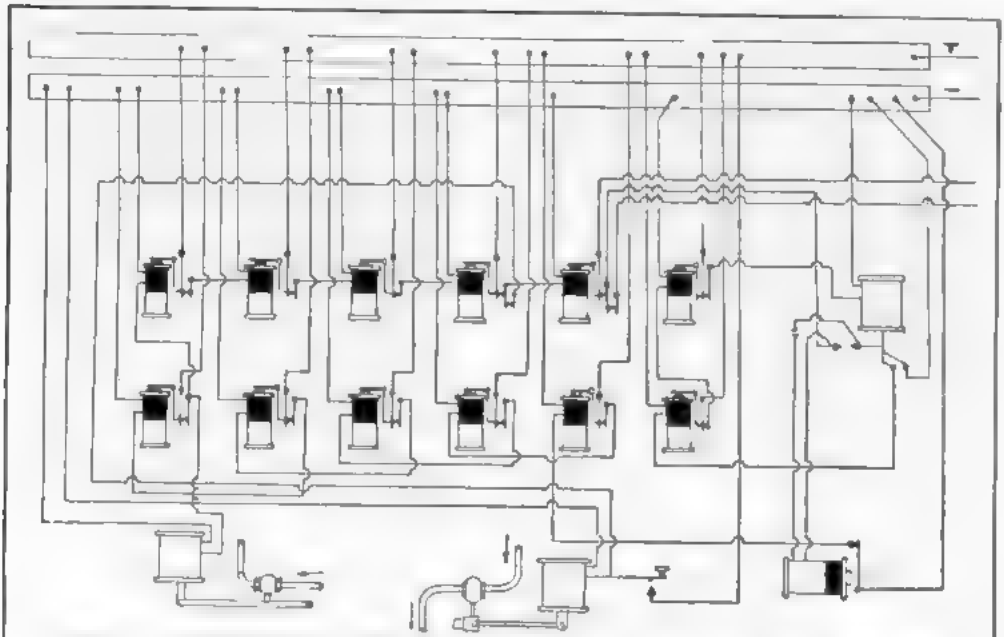
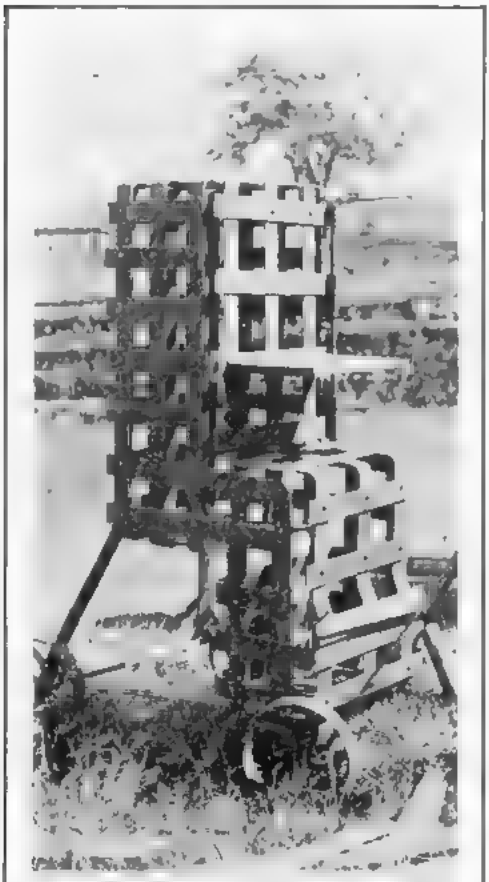


DIAGRAM OF THE WIRELESS RECEIVING APPARATUS WHICH ABSORBS THE WAVES FROM THE GENERATORS AND PREVENTS THE APPARATUS ON THE ENGINE FROM GIVING A WARNING UNTIL DANGER IS REALLY PRESENT

115 tons. The twelve cars behind it weighed about 240 tons more. A spectator declared that there was something positively uncanny about the performance. This may well be realized when one considers the weight of the train and the speed it had attained when the invisible wave gave warning of danger and proceeded to offset it. Apart from the value of the device for preventing rear-end collisions, experts say that it will tremendously shorten the time of freight trains between divisional points.

The facility with which such trains can, with its assistance, follow each other out of a station is evident.

HOBOES WHEELED FROM TOWN IN CHAIR-CAGE.



THE STUBBORN WEARY WILLIE WHO REFUSES TO OBEY THE CONSTABLE'S ORDERS GETS A FREE RIDE OUT OF TOWN IN THIS CHAIR.

SAID the municipal wisdom of a certain Maine town: "If like cures like, then a period of enforced rest should work out the temporary salvation of the sons of rest who stray within our borders."

Then the wise town thought out a practical application of the theory. Result: the community is religiously shunned by the gentry who pad the hoof and pan the handouts for a living.

The theory in the concrete took the form of a "tramp chair." The name of the genius who invented it isn't given; but that fact doesn't detract from the fame that should be his

The chair appears to fully fulfil all that it is called on to undertake when a hobo happens around.

As will be seen by the picture, the contraption follows the general lines of an ordinary chair so far as its shape is concerned; but in reality it is a cage made of strap-iron, big enough to accommodate the biggest Weary Willie that ever happened. It is equipped with four wheels of ample size so that it may be readily moved from place to place.

6,693,750 RIDE DAILY.

IN Greater New York there are in operation 11,350 passenger elevators and 6,500 freight elevators, the total number of elevators being 17,850. Here are some figures concerning them:

Average height of elevator buildings, 8 stories.

Average height between stories, 13 feet

Average height of elevator shafts, 104 feet

Average run a day of each elevator, 75 trips.

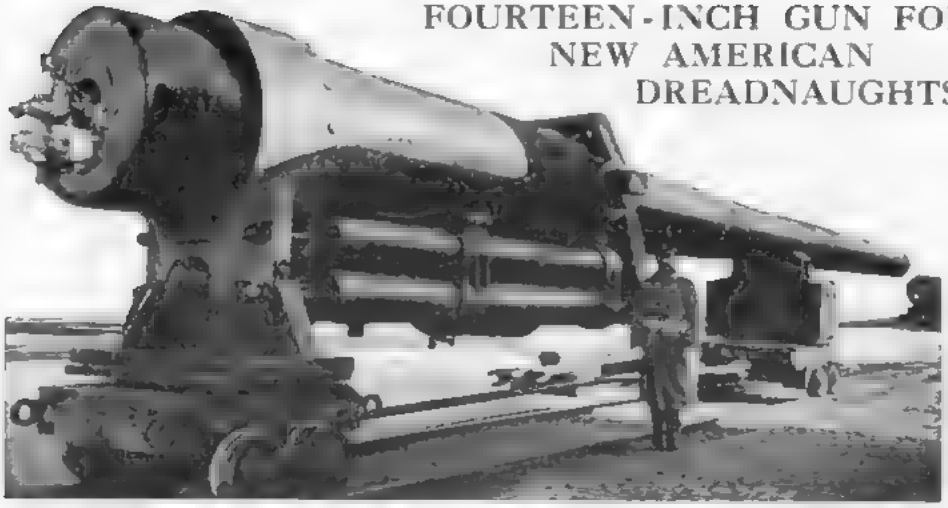
Distance traveled a day per elevator, 7,800 feet.

Total distance a day made by all elevators, 26,142 miles.

Average carried a trip per elevator, 5 passengers

Total carried a day by all elevators, 6,693,750 passengers.

FOURTEEN-INCH GUN FOR NEW AMERICAN DREADNAUGHTS.



FOURTEEN-INCH GUN FOR THE UNITED STATES NAVY ARRIVING AT THE WASHINGTON NAVY YARD. IT TOOK ONE YEAR TO CONSTRUCT THIS MIGHTY IMPLEMENT OF DESTRUCTION. IT WILL HURL A PROJECTILE WEIGHING 1,400 POUNDS WITH A VELOCITY OF 3,600 FOOT SECONDS REPRESENTING A MUZZLE ENERGY OF 6,500 FOOT-TONS

THE enormous proportions of the weapons necessary to preserve the safety of our country are strikingly suggested by the accompanying photograph of a monster fourteen-inch gun just installed in the Navy Yard at Washington. This huge gun, which hurls 1,400 pounds of steel at the enormous velocity of 3,600 feet a second, is intended for coast defense. Before it was pronounced safe, it was subjected to many tests under great pressure to insure the strength of the bore and muzzle. In use, it carries a gigantic charge of almost 900 pounds of powder. The projectile, fourteen inches in diameter, will pierce a solid foot of steel as if it were paper. A shot from this gun directed beneath the waterline of a battleship would cause almost fatal injury to her armor. Should it penetrate into the magazine of the ship a disastrous explosion would result. In shipping this gun to the navy yard its mechanism was covered with canvas and it was accompanied by a guard.

CAN'T BLOW IT OUT.

A LANTERN so equipped with a draft device that it is practically impossible for the wind to blow it out has just been invented by P. Spurgin, Edgeport, South Dakota, and is shown in the picture at the bottom of this page. Instead of the ordinary means of ventilation provided by holes around the collar of the burner, the Spurgin lantern receives oxygen through a series of small holes punched in the chimney. The light is thus effectively protected from any atmospheric currents which might extinguish it.

IF YOU ARE LOOKING FOR A LANTERN THAT THE WIND CAN'T BLOW OUT HERE IT IS

HOW OBSTACLES ARE OVERCOME WHEN

THE house and street-car shown in the photograph are moving in the same direction and at the same time; but on account of the different speed of each and owing to a vigorous protest from the railway company holding the franchise on that particular street, the movers were forced to raise the house high enough to let the street-cars pass beneath, making a shifting tunnel of the moving home.

The movers were required to place a bond with the Board of Supervisors of the city and county of San Francisco for the sum of $25,000 to cover judgments in any possible suits that might arise for damages to property along the route of moving or any accidents that might happen to the street-cars, vehicles, and pedestrians that passed beneath the structure.

The moving was accomplished with great difficulty, owing to the steepness of the grade, the passing traffic, and the size of the building, which is three stories high and contains about twenty-five rooms.

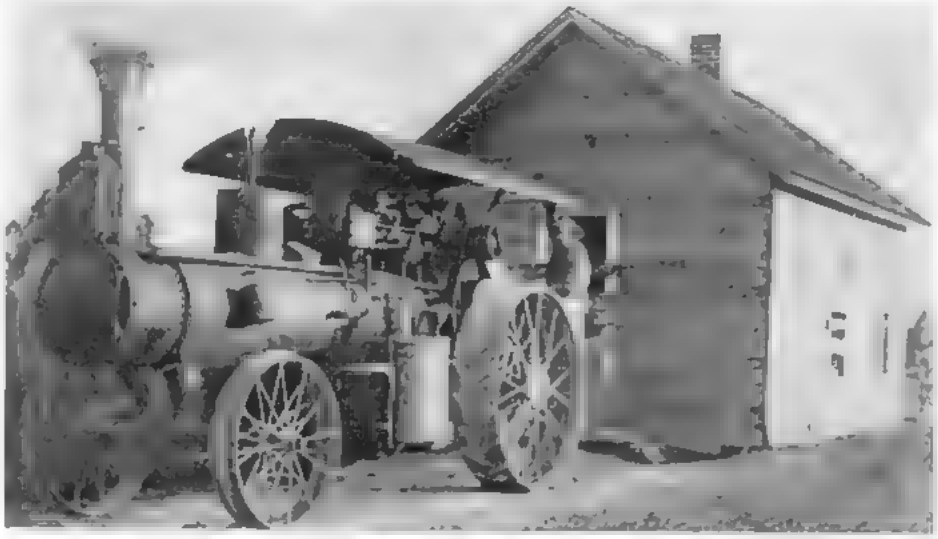
The house was successfully moved a distance of two city blocks, but the second block was down a grade which is seen only in the streets of San Francisco. Horse power was used to move the house along the level; but it was "slacked" down the hill by aid of ropes and cables. When it reached the lot selected for its new location it was rolled in and laid on the foundation without a hitch.

Moving houses intact is not new, but to move a house with a traction-engine is a distinctly novel departure from the old methods. THE RAILROAD AND CURRENT MECHANICS has illustrated several of these methods, but house-moving with a traction-engine is perhaps the first instance of the kind that has ever occurred in this country.

A small schoolhouse in a Montana

MOVING A SAN FRANCISCO DWELLING ON ELEVATED TRACKS SO AS NOT TO INTERRUPT STREET-CAR TRAFFIC

AN ENTIRE DWELLING MUST BE MOVED.



A FIFTEEN HORSE-POWER TRACTION ENGINE MOVING A SCHOOLHOUSE PLACED ON RUNNERS A DISTANCE OF ONE MILE

town was supplanted by a larger structure, and the town authorities decided to present the old schoolhouse to a village a mile away. The schoolhouse in the picture is twenty feet wide, thirty feet long, and fifteen feet high. To have taken it apart and reconstructed it would have involved almost as much cost as the erection of an entirely new building.

The problem of moving was solved by the owner of a traction-engine, who offered to attempt to haul the old building to its new site. The house was raised on jacks and lowered on two heavy wooden skids, to each of which was attached an iron chain with two-inch links. The movement of the building was begun at once and completed in about three hours

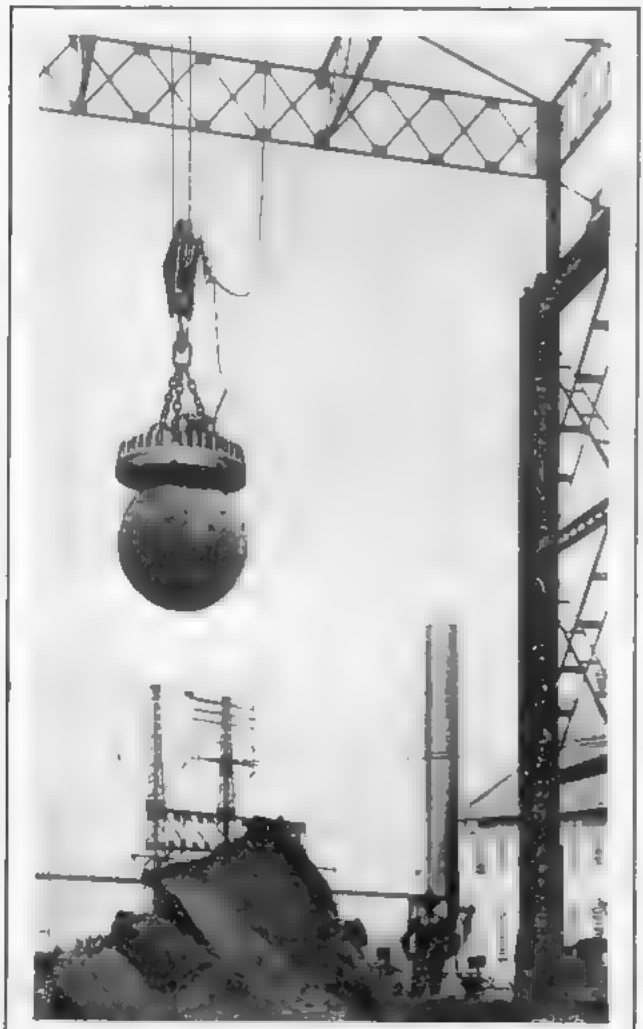
Some difficulty was experienced in making progress over soft spots in the ground, but these were easily overcome by filling them in with sand

One of our San Francisco readers very kindly calls our attention to the fact that we were in error in stating on page 450 of our August number that the schoolhouse weighing eight thousand tons recently moved entire for some distance in that city had horses for motive power. Donkey engines, held fast to steel spikes driven in the ground, did the moving. We regret the mistake

DID YOU EVER INVENT ANYTHING?

IF you have, the Current Mechanics Department offers you an opportunity to bring your invention before the public. This is a rare chance for the inventor who thinks he cannot find a way to let the world know what he is doing. If you have an invention that seems to be practical, let us see it. Describe it in three hundred words or less and mail it with photograph, blue print, or original sketch. We will pay promptly for whatever we accept. Unless accompanied by stamps, manuscripts or drawings will not be returned. Address, Current Mechanics Department, The Frank A. Munsey Company, 175 Fifth Avenue, New York.

ELECTRO-MAGNETS TOY WITH MIGHTY BURDENS.



SLAG FROM BLAST-FURNACES IS RUN INTO HUGE BALL-SHAPED MOLDS. WHEN COOL IT FORMS A SOLID MASS THE ELECTRO-MAGNET PICKS UP A TWENTY-THOUSAND POUND BALL WHICH IS GUIDED BY AN OVERHEAD CRANE TO A POSITION DIRECTLY ABOVE THE SLAG PILE THE CURRENT IS CUT OFF, THE BALL DROPS AND IS SHATTERED BY THE IMPACT

LIFTING magnets operated by electricity are rapidly supplanting cranes in many plants where the only material handled is metal. In hoisting and carrying such material, the magnet has many advantages over the crane. The crane necessitates chain and tackle, the adjustment of which consumes much time and introduces a certain element of damage into the work Cumbersome hooks and heavy links mutilate many men every year; in fact, this has become so serious a matter that it has been necessary to bring it to the attention of safety committees in various parts of the country. The latest safety-hooks are fitted with looped handles to protect the fingers.

Two of the most powerful lifting magnets in the world are shown in the accompanying photographs. Not only are they the most powerful, but they also prove the wide adaptability of the lifting magnet. The first picture illustrates a particularly novel method of handling slag. The slag from the blast furnace is poured into huge ladles, and when it has become cool it forms a hard, solid mass of globular shape. The magnet picks up a 20,000 pound lump of the waste as quickly and easily as a baseball player handles the leather sphere

Then the Current It Cut.

The magnet is suspended from an over-head runway, and along this it is carried to a position directly over the dumping ground. The current is immediately cut off and the huge globe-shaped lump drops and strikes the slag with such force that it is broken into small pieces, making further handling easier.

The picture on page 65 shows an expeditious method of handling steel rails with a magnet. The magnet is suspended from two hooks equipped with a wheel and cable for hoisting or lowering. The rails are laid in regular order, as shown in the picture, and this is practically all that is necessary. The magnet is lowered and the rails leap

forward tenaciously. Twenty - three rails, aggregating almost 30,000 pounds, are lifted, conveyed, and loaded onto a car in a few minutes. With this magnet almost 20,000 rails are handled in a nine-hour day.

One of the Oldest Forces.

Magnetism is one of the oldest known electrical forces. Before the thirteenth century it was discovered that certain iron ores in Magnesia, Asia, from which the word magnet was derived, possessed this mysterious quality. This probably started the strange story of the lodestone, for it was then believed that this ore was the real lodestone.

Some books were written on the subject by early philosophers and scientists, but it was not until almost 1700 that the truth was first hinted at. Of course, no such force as electricity was then known to exist, and magnetism was attributed to some miraculous element in certain matter. The peculiar ore of Magnesia lodestone, it is called—does have some magnetic influence on certain substances.

While powerful lifting magnets receive their attraction from an electric current of high voltage, it is possible to magnetize some metals by merely bringing them into contact with lodestone. With steel and hard iron of good quality this magnetic quality received from the lodestone will persist for some time, but it is extremely evanescent in soft iron.

A bar of iron or steel made magnetic by contact with lodestone, if thrust into a mass of small metal filings, exerts very little attraction in the middle of the bar, but is quite effective at the ends, showing the presence of the electric poles.

THIS PHOTOGRAPH SHOWS HOW EASY IT IS FOR AN ELECTRO-MAGNET CRANE TO HANDLE TWO DOZEN STANDARD-LENGTH RAILS HAVING A COMBINED WEIGHT OF NEARLY THIRTY THOUSAND POUNDS

IN ORDER TO HASTEN THE WORK OF IMPROVING ITS PUBLIC HIGHWAYS, THE STATE OF PENNSYLVANIA IS USING POWERFUL MOTOR TRUCKS TO CARRY ROAD-BUILDING MATERIALS. BY TAKING THE PLACE OF TIRED HORSES THE WORK HAS BEEN INCREASED TWENTY-FIVE PER CENT

MOTOR TRUCKS FOR GOOD-ROADS WORK.

THE State Highway Department of Pennsylvania is well equipped with men, money, and machinery for the work that falls under its jurisdiction; but the officers of the department point with special pride to the number of motor vehicles that form part of the outfit. That their boast is not entirely without foundation the picture above proves. This truck was specially built to carry road mending and making material and, when the occasion arises, for all-round service. The body of the truck tilts to practically any desired angle in order to shoot the load to the ground. The machinery by which this tilting is accomplished is worked by the motor.

WILL OIL REPLACE COAL ON BRITISH WARSHIPS?

OIL firing in the British Navy is a subject which may, and indeed must, be looked at from more than one point of view, says *The Engineer*, London. Of its advantage there can be no question. Oil increases the radius of action, it eases the work of stoking, it is more easily taken on board, it gives greater speed. Ships of the Queen Elizabeth class could not be what they are were it not for oil. All these things we know, and they are apt to blind us to the drawbacks to the use of oil in the British Navy. The greatest of these is the fact that, save for a very small amount, no oil is found or produced in these islands. We have to look to foreign lands for our supplies; the oil we use has to be brought over many miles of sea. Hence millions of tons must be stored, lest in the event of war we should find our vessels made useless by the lack of fuel. The stores have to be protected against hostile attack, and they are more difficult to safeguard than are stacks of coal. All this is common knowledge. What we have to ask ourselves is whether or not the disadvantages which attach to the use of oil are balanced by its advantages.

DESPATCH SIGNAL-TUBE FOR WAR AEROPLANES.

AERIAL navigation is being constantly improved, not only in regard to the flying-machines themselves, but also as to accessories and devices serving to increase the ease with which the purposes of the machines may be accomplished. In military aviation if the flier were compelled to land whenever he desires to impart his observations, his usefulness would diminish considerably. Wireless telegraphy and carrier pigeons allow him to communicate with the officers on land, who may thus be warned instantly of the movements of troops.

A young French aviator, Paul Fugairon, has just invented a new device for this purpose, known as the aero-tube despatch signal, which has been tried out near Brest, France, with interesting results.

Flares After Fall.

The tube-signal is so made that it may be dropped from an aeroplane or from the basket of a dirigible. On landing, a Bengal or signal light is ignited, which burns long enough to allow people to get to it from a distance of over three hundred yards and pick it up, even during the night.

The apparatus consists in a cylindrical tube T, in which the despatch is enclosed (see page 68). The base of the tube has a cap O, weighted with lead, so that the device falls vertically. The tube T is also provided with a partition which keeps the message apart from a small chamber, C, containing the mechanism of percussion. At the upper end of the Tube T is fitted a cover D of peculiar shape and provided with a vent F to permit the exit of the flame and smoke of the signal fire.

Despatches Cannot Ignite.

Within this cover, at its base, an arrangement of claws permits the fastening securely of the light-cartridge, the fuse of which passes through the tube E, at the base of which is fastened a fulminate cap.

At the side of the tube may be seen the external mechanism of percussion as it communicates with the internal arrangement. The latter consists in a rod H passing through the lower cover. This rod is permanently pushed out-

THE DESPATCH IS IN THE TUBE AND THE CAP READY TO BE SNAPPED ON

COCKING THE PERCUSSION ROD JUST BEFORE DROPPING THE TUBE TO EARTH.

wardly by a spring R, which rests partly on the partition J and partly on the shoulder J upon the rod.

In chamber C the rod operates two levers, K and L. The lever L issues from the tube through an opening and its free end holds a shoulder M on the vertical percussion-rod G. The latter can move vertically between the guides N N and is acted on by a spiral spring R, resting at one end on the shoulder at N and at the other on the shoulder S of the percussion rod.

The action is easily understood. The despatch is enclosed in the tube, the cover is closed, the signal-cartridge is introduced, and the percussion rod is cocked as shown in the photograph on this page.

The mechanism is then in the position shown in the drawing on this page, and the tube is thrown out by the aviator. It falls vertically, owing to the lead weight. When it reaches the ground the spring R is pressed upon by the rod H and lifts up the system of levers K and L.

Made of Sheet Aluminum.

The latter is upset on its axis and its end pushes the shoulder M. Then the spring R is put in action and the percussion rod G strikes the cap or detonator of fulminate, which sets fire to the fuse which ignites the signal fire

This clever instrument, which may be used at night as well as day, was first made of steel, but later on the inventor found that sheet aluminum was lighter and caused the apparatus to sink less deeply in the soil

There is, of course, no difficulty in throwing out the tube. This is done with an aiming system which will be described in this magazine in a future number. It was devised by the same inventor and is also adapted to the firing of torpedoes. From a good height it enables the aviator to cause the tube to fall quite near the place where men may be waiting for it

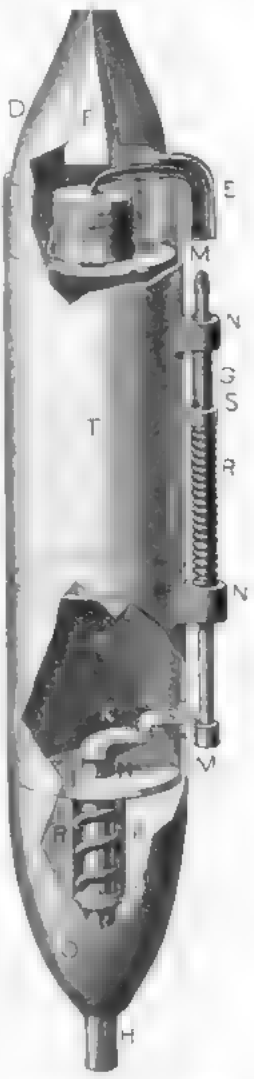


DIAGRAM OF THE TUBE

All of this indicates another step forward in the effort of France, Germany, Italy, and Great Britain to establish the aeroplane as a factor in war. For some time it was evident that aeroplanes carrying despatches could not deliver these despatches owing to the fact that it seemed an easy matter to intercept them. In the daytime the aeroplane speeding through a clear sky is more or less an easy mark for the various kinds of cannon especially designed to destroy them, and which were fully described in the July and August numbers of THE RAILROAD AND CURRENT MECHANICS.

Granting that in the daytime an aeroplane could escape a battery of such cannon, the possibility of delivering despatches safely was very doubtful, owing to the fact that the despatch tubes could be seen hurtling from the sky. The idea is plain enough. Carrying of despatches will be done largely at night. The aeroplane skims through the sky: it carries no lights and the whirring noise of its engines, if at all perceptible, does not render it an easy target for a night attack. Shooting at a noise in the sky is neither profitable nor good warfare. The messengers of the aeroplane, when they pass the division or headquarters, or wherever a despatch must be delivered, simply throw out a signal-tube. When it strikes earth its flare attracts the soldiery who are on the lookout.

That aviation is to play an important factor in all future warfare is conceded by every close student of such matters, and, strange as it may seem, the United States appears to be the least interested of all the powerful nations. Foreign critics have pointed with wonder at what seems to be Uncle Sam's suspended animation. The editor of *Flying*, who persistently and wisely jogs our memory about this shortcoming, recalls that in the early days of aviatorial history the American Navy alone was the first to evince a belief in the ultimate usefulness of the aeroplane in naval warfare. The first machine to rise from the deck of a war-vessel flew from the U. S. S. Birmingham, while the first to alight upon shipboard came down on the U. S. S. Pennsylvania. Since then only a limited interest has been manifested.

THE OBJECT HELD IN THE RIGHT HAND IS THE PERCUSSION CAP, -IN THE LEFT IS THE VENT TO PERMIT THE ESCAPE OF THE SIGNAL FLAME. THE DESPATCH CAN BE SEEN PLAINLY IN ITS TUBE. THE TUBE FALLS VERTICALLY OWING TO ITS LEAD BASE.

CARRYING WINE AND WATER IN EGYPT.

PERHAPS you may think this is an animal tamer doing a circus stunt with one of his four footed troupe, or a muscular arctic sport toting a defunct polar bear to his igloo. If so you'll be in wrong on both guesses The man is giving the beast a lift because the latter is full—of wine, at that. No, it isn't charity that prompts the action; it's business. For the human is a wine-seller of Egypt, and his burden is his wine cellar, so to speak.

Egypt, under British rule, is blessed with moving pictures, corsets, canned goods, the Askodan Dam, a native press, and the makings of revolutions and cigarettes. But the native population still sticks to a whole lot of things and customs that date back to the times of the Pharaohs. The picture shows one of such.

For some reason or other, the *fellaheen,* or peasantry, as well as a goodly portion of the population of the towns, haven't any use for bottles, kegs, barrels, or casks of Caucasian civilization. The British brought these to the land of Osiris and Isis in countless numbers, but they were taboo with the Egyptian multitude. Instead, the skins of animals—goats, sheep, calves, and even young camels—were preferred to hoops and staves for the purpose of peddling liquids.

The skins are first scraped, then kneaded by hand to prevent them from becoming stiff. They are next dried and carefully stitched up—all but the ankle of one leg. Gum is worked into the seams to make them water-proof.

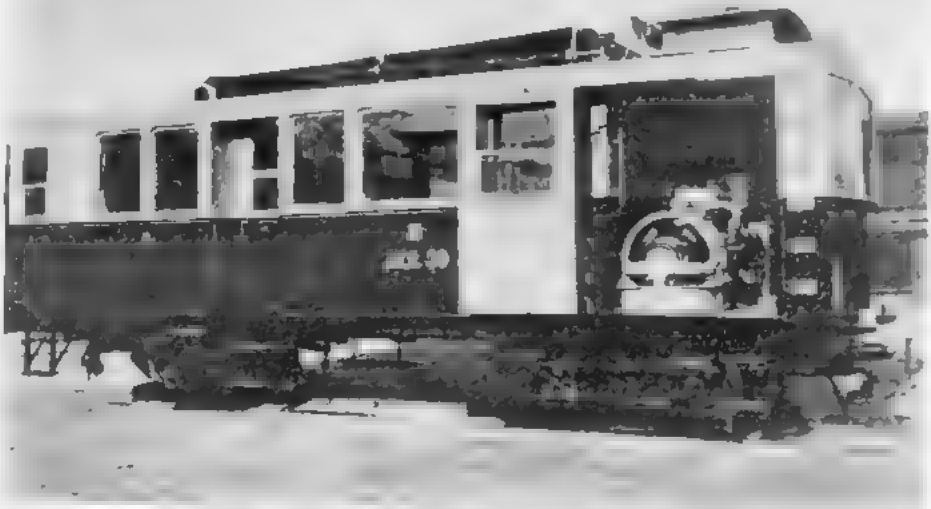
The skins are also used by venders of water; but when so used the skin is slung around the neck of a man, who, grasping the open leg with one hand, allows a stream of water to trickle into the receptacle of the purchaser.

If you have sufficient pluck to patronize one of the venders he will dexterously shift the bloated form that he carries to such a position that the leg-faucet is placed handily before you. Then he unfastens the leather thong with which it is bound and measures out the wine in a cup carved out of a species of palm.

THIS IS NOT A MAN TRYING TO BALANCE A WILD BEAST ON HIS HEAD. IT IS SIMPLY PART OF THE WATER SUPPLY OF AN EGYPTIAN CITY

The skin may be biblical and picturesque, but both wine and water taste somewhat of the animal that supplies the cask

Crude as these methods may seem to us, it is said that the skin casks remain water-tight for many months. The strength required to carry one may be appreciated from the fact that some of the skins contain as much as twenty gallons of water.



ONE HUNDRED HORSE-POWER GASOLINE ELECTRIC MOTOR-CAR BUILT IN FRANCE FOR SEVEN-HUNDRED-MILE RAILWAY IN HUNGARY. IT WEIGHS SEVENTEEN TONS AND IS DIVIDED INTO TWO COMPARTMENTS

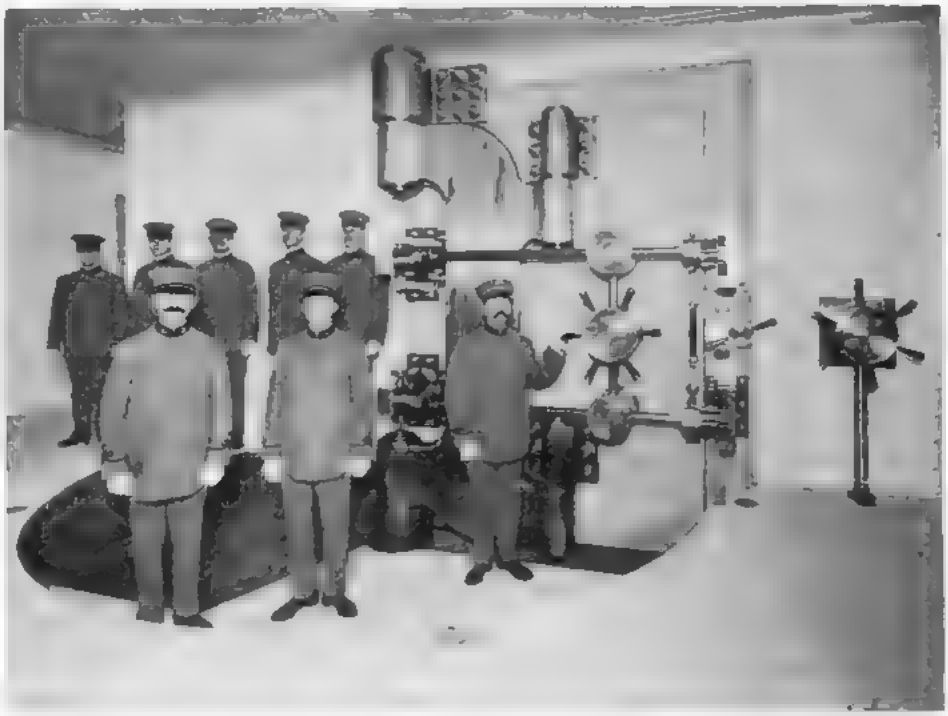
GASOLINE-ELECTRIC CARS MAKE 700-MILE RUN.

IN Hungary a new gasoline-electric motor-car is attracting considerable attention. It was built in Havre, France, by the Société Anonyme Westinghouse, and has a capacity of one hundred horse-power, six cylinders, directly coupled to a four-pole direct-current generator. It is maintained that great success has followed the introduction of this type of car on the railroad between Arad and Csnad, Hungary, a distance of seven hundred miles. The gasoline-electric car weighs about seventeen tons. It is divided into two compartments for second and third class passengers. It can maintain a speed of sixty miles, if needed, and the directors of the road claim the cost of operation is very low.

It is very evident that cars of this pattern have solved the problem of inexpensive railroading over certain distances—a question that is more serious in Europe than in the United States. The cars are equipped with unusual power for their size, for the reason that when traffic is heavy three or four trailers are carried and, frequently, a baggage-car of about seven tons' capacity. The problem of carrying first, second, and third class passengers on a single train in Europe will never be overcome, in all probability.

SEND ALONG YOUR GOOD IDEAS.

WE want ideas accompanied by illustrations for the Current Mechanics Department of this magazine. We want ideas that have something back of them. Ideas that are new and original that may be worked up into something useful and practical. We want ideas that cover every phase of human endeavor. We will pay promptly for any that are acceptable. Unless accompanied by stamps, manuscripts or photographs will not be returned. Address, Current Mechanics Department, The Frank A. Munsey Company, 175 Fifth Avenue, New York.



THE UPPER FORTY TON DOOR OF THE GREATEST VAULT IN THE WORLD. THE DOOR IS SO WELL BALANCED ON ITS HINGES THAT IT CAN BE OPENED OR CLOSED BY HAND. IT IS LOCKED BY AN ELECTRIC CLOCK SET BY THE VAULT OFFICER AND ONE OF HIS ASSISTANTS. THE VAULT IS TWO STORIES HIGH.

Photograph by Brown Brothers, New York.

DEFIES BOTH THIEVES AND DYNAMITE.

THE ingenuity of burglars and cracksmen has been a large factor in the development of safes and vaults. If no one would steal; if human poverty and greed did not compel men to defy the law, then it would mean nothing to leave a few hundred thousand or any amount of money lying about where it could easily be stolen. But wealth must be hidden behind strong doors, for it offers too great a temptation.

The modern vault has reached enormous proportions, and a trust company in New York City has just come into possession of the largest and most impregnable vault in the world—a skyscraper vault, two stories high. Its every proportion denotes strength and the power to overcome the efforts of the yeggman to enter it when it is once locked. Behind its massive doors is $3,000,000,000 in money and securities.

It is a challenge to the skill and persistence of the dishonest, but because of its mighty efficacy the challenge must go unheeded. It is two stories high, 35 feet wide, and 24 feet deep, containing almost three-quarters of a mile of shelves. It offers access through two doors, upper and lower, which lead into the upper and lower chambers. These doors weigh forty tons each. A man seems rather helpless in an attempt to move forty tons, yet these gigantic doors are so delicately set upon their hinges that they can be pushed by the hand with effort.

The doors, which are three feet thick, are hung on hinges each weighing seven tons. Fifteen bolts, 900 pounds each and 5 inches in diameter, hold the doors securely after they are locked. Huge as these doors are, they are not alone the only protection. The walls are 2

feet 4 inches thick and made up of concrete and steel. A four-inch wall of drill-steel comprises the exterior, and this is reenforced by two feet of concrete

The locks are controlled by electricity They are set each day at closing time and will then remain shut until it is time to reopen them on the following morning

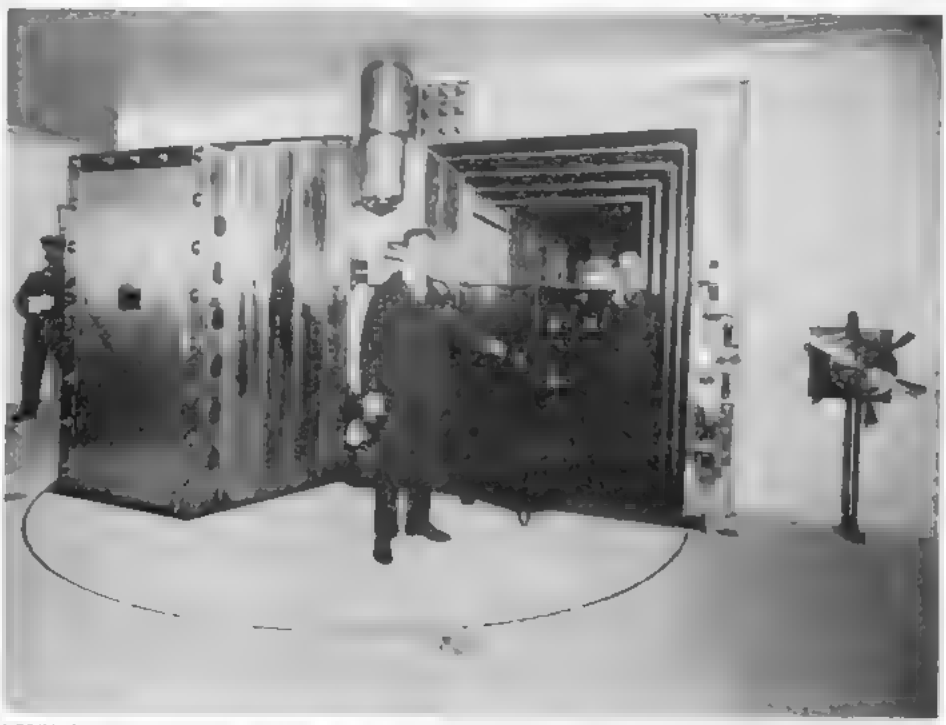
Should any employee of the trust company be accidentally imprisoned in the vault, it is only necessary for him to turn on an electric switch and in either vault he can find a telephone with necessary instructions as to whom to notify over the phone

The clock is set by the vault officer and one of his assistants, of which there are seven

One peculiar feature of the vault is the movable floor in front of the door The pressure of a button will lower the floor to the position shown in the picture on the opposite page or raise it as shown on this page. The floor is necessary because the doors of the vaults extend below the floor of the vault, and when the movable floors are raised the vaults may be entered without difficulty, as is apparent in the illustration on this page

Not only does this wall oppose the intruder with its steel and concrete, but should any venturesome burglar in some manner manage to find the opportunity to attack it, another obstacle—perhaps more effective than the wall itself—would confront him. This is a hidden obstacle that offers no alternative, for should the burglar discover it, it would then be too late. This obstacle is the almost endless wiring of the wall with alarms.

Thirty-six thousand feet of wire, more than six miles, thread their way through the barrier as a further protection against invasion



UPPER DOOR OF THE VAULT WHEN OPEN IN ORDER TO CLOSE IT THE PORTION OF THE FLOOR (OUTLINED BY THE CIRCLE AS SHOWN IN THE PICTURE ON THE OPPOSITE PAGE) MUST BE LOWERED WHEN THE DOOR IS OPENED THE FLOOR IS RAISED BY PRESSING A BUTTON THE ENORMOUS DOORS ARE THREE FEET THICK AND SWING ON HINGES WEIGHING SEVEN TONS EACH

Photograph by Brown Brothers New York

THE HULL OF COMMODORE PERRY'S FLAG-SHIP NIAGARA, ABOARD WHICH HE WON THE BATTLE OF LAKE ERIE, RECENTLY RAISED AFTER REPOSING FOURSCORE YEARS AND EIGHT AT THE BOTTOM OF THE LAKE

Photograph copyrighted by Underwood & Underwood, New York

88 YEARS AT THE BOTTOM OF LAKE ERIE.

FROM a patriotic, sentimental, or historical point of view, the brig Niagara is the most notable craft afloat. That she is once more on the surface of the water after lying at the bottom of Lake Erie for eighty-eight years is due to the suggestion of Lieutenant W. L. Morrison, of the volunteer naval force of Pennsylvania. He called the attention of the Perry Centennial Committee to the appropriateness of making the famous old craft an integral part of the celebration in honor of the famous naval commander, and the committee indorsed the idea

The work of raising the Niagara was begun a year ago. After some months of effort the work was brought to a successful conclusion. In spite of the batterings of war and weather and nearly a nonogenerian's span under water, the hull was found to be remarkably well preserved.

The Niagara formed one of the fleet that Lieutenant Oliver Hazard Perry, then twenty-four years of age, had managed to assemble at Presque Isle Bay on Lake Erie during the early summer of 1813. The biggest and most heavily armed of the nine ships that constituted the fleet were Perry's flag-ship, the Lawrence, and the Niagara

The armament of the Niagara consisted of eighteen 32-pound carronades and two long 12-pound guns, the latter being used forward as bow-chasers. The total weight of metal that the Niagara could discharge at one time from her broadsides was 600 pounds. Today a single 12-inch gun will hurl 850 pounds of destruction over ten miles

It was not until September 10, 1813, that the battle of Lake Erie was fought The British fleet consisted of six ships and the guns were less than those of the Americans. At the opening of the fight the Lawrence was so badly battered that Perry shifted his flag to the Niagara. When victory perched on the Stars and Stripes he went back to his flag-ship in order to receive the surrenders of the British officers on her deck

In 1825 the Niagara was ordered sunk by the Navy Department in Misery Bay, Lake Erie, because it was thought that she had outlived her usefulness

When, last year, the work of raising her was begun, it was found that she lay in about twenty-five feet of water and was completely covered with six feet of sand. A "sand sucker" was used to uncover the hull. When this was accomplished the work of actual raising took place

Forced by hydraulic jets, four heavy chains were forced under the hull. They

were then made fast to strong beams supported by pontoons on either side of the submerged vessel. Levers twenty five feet in length then drew up the chains link by link until the Niagara was once more on the surface

The work was done without any damage to the hull. The craft was gradually shifted to the shore, beached, and prepared for restoration, or, to be accurate, rebuilding.

THE BOW OF THE FAMOUS VESSEL BEING RESTORED TO ITS PRISTINE GLORY AFTER HER LONG SLEEP UNDER THE WAVES THOUGH COVERED WITH SIX FEET OF SAND HER TIMBERS WERE STILL SOUND WHEN SHE CAME TO THE SURFACE

Photograph copyrighted by Underwood & Underwood, New York

To accomplish this the hull was set squarely in position and a bed and ways constructed. The lines of the vessel were transferred to a temporary mold loft. The rebuilding then began, and her original proportions were faithfully followed.

During the centennial the Niagara was towed from port to port for exhibition purposes by the U. S. S. Wolverine, which has the distinction of being the oldest iron ship in the United States Navy.

The Niagara's keel of 14 x 18 inch oak is so wonderfully well preserved that it was used in its entirety in the restoration of the craft

One of the pictures shows the gallant old craft, broadside on, just after she was beached, and the other gives a view of her bows. Note the strong and graceful lines of the ship.

Captain Oliver Perry, a young American naval officer, had been sent in 1813 to Erie, Pennsylvania, to build a fleet to engage with the British squadron which held Lake Erie. When finished, there were nine ships in all—three brigs, a sloop, and five schooners. The brig which was to be Perry's flag-ship he named the Lawrence, in honor of the hero who had fallen on the Chesapeake Owing to the scarcity of men to man the ships, the government fitted up a dozen stage-coaches in Boston, with four horses each, and in these the sailors were taken to Lake Erie. These jolly tars decorated their coaches with flags and streamers and, with a band of musicians, rattled through the country to the tunes of "Yankee Doodle" and

"Hail Columbia," waking the huzzas of the people as they drove through the scattered villages from Boston to western Pennsylvania

When Perry got his ships manned he had only one more wish—to meet his enemy. Day after day Perry watched in vain for a sail.

"Don't Give Up the Ship!"

One pleasant morning, the 10th of September, the cry "Sail ho!" resounded from the masthead of his vessel. Word that the English fleet were coming spread from ship to ship. By ten o'clock that day six English ships hove to and lay in a compact line, waiting the approach of the Americans.

Perry had nine ships, the British only six; but the Americans carried only fifty-four guns, the British sixty-three. In close encounter the Americans would have the advantage; at a long range the English guns could do the deadliest work. This decided Perry to approach quickly and save his fire till he was close to the enemy. But before giving the order to draw near he brought from his cabin a banner of blue cloth inscribed with these words, "*Don't give up the ship.*"

The command was given to advance, and on went the Lawrence with the blue banner aloft. Barclay, the English commander, was on board the Detroit, the largest and best vessel of his squadron. He leveled his fire at the Lawrence as she approached. True to his resolution not to fire till he was close at hand, Perry kept his guns quiet till within short range.

Then he opened fire, and all the ships of both lines engaged.

The Lawrence Riddled with Shot.

For almost three hours a deadly combat waged, filling the air with smoke and flame, with the roar of guns and the cries of wounded. On his bloody deck Perry saw man after man go down. His lieutenant, wounded in the face by a splinter from a gun, was streaming with blood, but stanchly refused to go below.

Perry's brother, a boy of twelve, stood beside him until he was struck by a splinter and was carried to the cabin. Of one hundred men in the fulness of strength and vigor that morning, only eighteen remained standing on the deck. The Lawrence, too, was in as bad plight as her crew. With shattered masts, ragged sails, and every gun silenced, she lay, a battered hulk, at the mercy of the enemy.

In this emergency Perry saw the Niagara, the second ship in his fleet, apparently fresh and uninjured. He immediately ordered a boat to be lowered and, wrapping himself in the banner which had streamed abroad through all the conflict, he leaped into the boat and ordered four of his crew to row him to the Niagara, which was to be his flagship for the rest of the battle.

As the boat sped over the waves the guns of the Detroit sent discharge after discharge at the tiny craft. Standing upright in the boat, Perry was a shining mark.

The shells cut the water on every side, but the boat was untouched.

Perry's Humanity.

On reaching the Niagara Perry climbed rapidly up her sides and trod the deck of a fresh ship, ready for action. With tremendous energy the fight was renewed.

The Niagara broke the line of the enemy, raked her two foremost ships with terrible destruction, and in fifteen minutes from the time Perry stepped on board four English ships had struck their colors and a white flag was flying from their bows. The two smaller ships of the squadron showed their heels in an attempt to escape, but two of the American schooners gave chase and very soon brought them back as prisoners of war.

It was a memorable sight when Perry stood on the deck of his vessel, among the men who died in her defense, and the English officers tendered him their swords, hilt foremost, in token of their conquest. He refused to take their swords and treated his prisoners with such generous kindness that Commander Barclay afterward declared, "Perry's humanity alone should have immortalized him."

MALLET ENGINE BUILT ON BRITISH PATTERN.

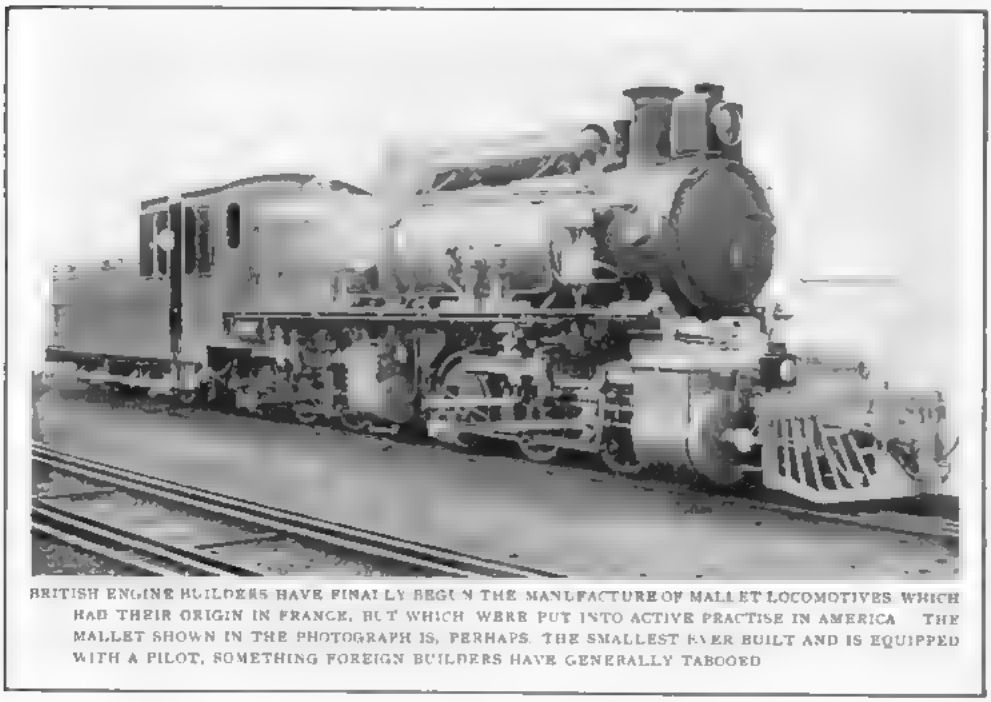
THE many readers of THE RAILROAD AND CURRENT MECHANICS who are interested in locomotives, both old and new, will find the Mallet shown in the accompanying photograph an interesting study. It is the first of this type ever turned out in Great Britain, where the largest locomotives have heretofore been of the Mikado type.

However, this particular Mallet is unusually small—smaller, indeed, than any ever built in this country, where the only reason for adopting the Mallet type was owing to the fact that larger and stronger locomotives were needed. It became a question here of securing the greatest aggregation of driving-wheels that could be used with a rigid wheel-base. When it was discovered that more than ten driving-wheels could be employed, it was found necessary to go into the articulated locomotive.

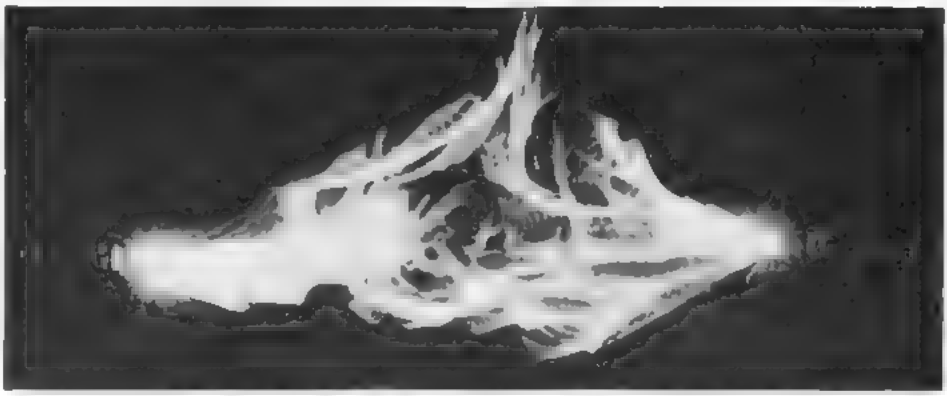
This particular style is called the Mallet and was originated by Anatole Mallet, of Paris. In this device there are four cylinders, each pair operating a set of driving-wheels in individual frames, the two sets being connected.

In Mallet locomotives the rear wheels are operated by high-pressure cylinders receiving steam direct from the boiler, and this steam, after passing the high-pressure cylinders, goes through an intermediate receiver into the low-pressure cylinders and finally to the exhaust. The various heaters are utilized in some cases, first to superheat the steam before passing to the high-pressure cylinders, and secondly to reheat the steam in its passage from the high to the low pressure cylinders. The feed-water heater at the front end has been used to abstract heat from the gases during their last passage in the boiler so as to increase the temperature of the water and bring it practically up to a boiling point (at boiler pressure) before being delivered into the boiler proper. These various combinations of heaters and compound cylinders, of course, very considerably reduce the fuel consumption, which is an important factor.

When Mallet first placed his invention before the world he was laughed at; but he has lived to see it the biggest phase of modern locomotive practise



BRITISH ENGINE BUILDERS HAVE FINALLY BEGUN THE MANUFACTURE OF MALLET LOCOMOTIVES, WHICH HAD THEIR ORIGIN IN FRANCE, BUT WHICH WERE PUT INTO ACTIVE PRACTISE IN AMERICA. THE MALLET SHOWN IN THE PHOTOGRAPH IS, PERHAPS, THE SMALLEST EVER BUILT AND IS EQUIPPED WITH A PILOT, SOMETHING FOREIGN BUILDERS HAVE GENERALLY TABOOED



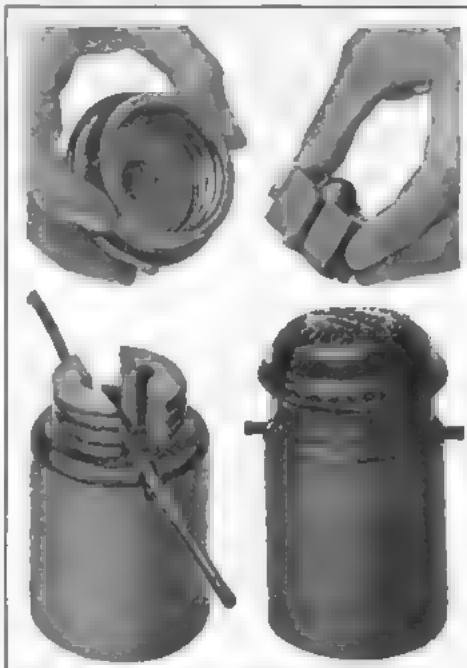
TWO HUNDRED THOUSAND VOLTS OF ELECTRICITY PASSING BETWEEN THE ENDS OF TWO WIRES TWENTY-FOUR INCHES APART. BY MEASURING SUCH A GAP IT IS POSSIBLE TO APPROXIMATE THE STRENGTH OF POWERFUL CURRENTS.

VOLTS THAT VOLTMETERS CAN'T MEASURE.

THERE are several electrical transmission lines in the United States that carry 150,000 volts, and one is projected that will carry 165,000 volts. These enormous differences in potential require special apparatus. Safety is necessary, of course, and so transformers, insulators, switches, etc., must be tested to safely handle a greater voltage. There are no voltmeters made that will measure these high voltages, and it is customary to measure by spark gaps. The terminals are placed certain distances apart, and by the length of the gap and the character of the material of which the terminals are made, usually a group of fine points, electrical testers can quite accurately judge the voltage. The photograph shown here was made as 200,000 volts was bridging a gap of twenty-four inches.

INSULATOR WITHOUT KNOTS.

A NEW electrical insulator, which obviates the tying of wire ends has just been installed in the general post-office of London. It is shown in the accompanying illustration. In addition to being more convenient, it affords better insulation for direct transmission of current, and, being extremely simple, wires can be laid faster. In installing the wiring the wire is passed through a small groove in the base of the device and the two upper parts are placed in position and firmly screwed down. The parts fit together as shown in the photograph. As the wire is rigid it will withstand a greater strain.



NEW THREE PIECE INSULATOR INSTALLED IN LONDON'S GENERAL POST-OFFICE OBVIATES THE TYING OF WIRE ENDS AND HOLDS WIRES RIGIDLY WHEN PLACED TOGETHER.

BOILER FOR A 475,000-POUND MALLET.

THIS is a picture of the boiler of one of the Mallet locomotives, weighing 475,000 pounds, now being built at the American Locomotive Works, Paterson, New Jersey. Its huge dimensions are emphasized by the figure of the man standing by its side

The importance of the boiler in the make-up of a modern locomotive can hardly be overestimated. No matter what mechanical skill may have been employed in the design of an engine, it will be a failure unless the boiler meets its demands. The problems involved in boilermaking have become more numerous and involved with the increase of speed and tractive power demanded by transportation. As a result, boiler designing within the past few years has resolved itself into a progressive science

THE MALLET TYPE OF LOCOMOTIVES USED SOLELY FOR HEAVY GRADES, REQUIRE BOILERS OF VERY LARGE DIAMETER THIS BOILER IS FOR AN ENGINE OF 115,000 POUNDS TRACTIVE-POWER WORKING COMPOUND IT HAS OVER 6,000 SQUARE FEET OF TUBES AND FLUES, A SUPERHEATING SURFACE OF OVER 1,000 SQUARE FEET AND A FIRE BOX OF 180 SQUARE FEET

The boiler pictured is a fine specimen of the standard type used for heavy work. Its main features are a straight round top and a wide fire-box that extend over the driver or traveling wheels

The enormous strains to which a high-pressure boiler is subjected call for the most accurate proportions and especially the proper staying of its parts. The boiler shown has passed through the series of tests prescribed by railroad law, including "pulling" the sheets of steel of which it is made; also "cold bending" and chemical tests. Its stay-bolts have been subjected to the "pulling," "twisting," and "expanding" tests, and its tubes have undergone all of these, as well as the "crushing" ordeal

Finally it had to go successfully through the hydrostatic test of at least twenty-five per cent above its working pressure. This boiler will carry 200 pounds of steam-pressure, in which case it will first be given the water-pressure of 250 pounds and then be fired up until its steam registers 230 pounds per square inch

To the eye of the layman a boiler of this size and type stands for permanence. As a matter of fact, once in service all locomotive boilers deteriorate quite rapidly. While the outer shell may last indefinitely, the stay-bolts, flues, and fire-box frequently show wear too early to please the master mechanic The life of the tubes, too, is extremely variable, depending on the service in which the engine is engaged and the quality of water used.

Water trouble prevails principally in the West, where the presence of alkali makes the water extremely hard. In some sections it is so hard that it is necessary to erect water-softening plants at different points.

IMPERISHABLE ECHOES OF GETTYSBURG.

Life's fitful day declines, its twilight, fading,
Draws lengthening shadows from the broken flanks,
And at their head a viewless chief is calling:
"Guide right! Close up the ranks!"

Thomas Riordan

THOUGH the tread of martial footsteps is dying out, the pages of history will ever resound with the deathless story of Gettysburg — one of the greatest and bloodiest of the world's battles. Of the heroes who were born in the three days of terrific strife there are but a few pitiably inadequate words. Nor are there words to write hyperbolically of the martyrs who died fighting nobly because it was sweeter to confront death and die to win than to seek safety to live and bow their heads in defeat.

On July 1, 2, and 3, fifty years ago, the conflict staggered the nation with its fearful loss of life. For three days women lived in a torment of uncertainty, distressed by the horrific knowledge that a beloved one stood in the line of battle. Bold hearts fought bravely for a nation-rending difference of conviction, while tender hearts and tearful lids fluttered at home.

It will never pass from the memory of man. It was fitting that the fiftieth anniversary of the battle should have been marked by a reunion that filled the streets and battle-field of Gettysburg with survivors of the combat and thousands of patriotic Americans who had come that they might raise their hats reverently over unmarked graves of the martyred

(LEFT TO RIGHT) JOHN MCPHERSON, CONCORD, MASS. WILLIAM G. NEWMAN, SPRINGFIELD, MASS., AND CHARLES BERGER, MCFARLAND, WIS. THE ONLY THREE LIVING FIFERS OF THE BATTLE OF GETTYSBURG. THEY WERE ENROLLED WITH MORGAN'S FAMOUS DIVISION. THIS PHOTOGRAPH WAS TAKEN IN FRONT OF THEIR TENT AT THE RECENT GETTYSBURG REUNION, WHILE THEY WERE PLAYING THE OLD TUNES THAT THRILLED THEIR COMRADES TO VICTORY.

Photograph copyrighted by Eustace Hale Hall, New York

dead, that they might tread upon hallowed soil made immortal by the voice and undying words of the mighty captain, Abraham Lincoln.

North and South met to condole, to clasp hands in forgetfulness of a vast folly. A half-century had wrought a great transformation. The robust soldier of the sixties had become the aging veterans of the Grand Army of the Republic—the long, thin blue line that is growing shorter, ever so shorter, each year.

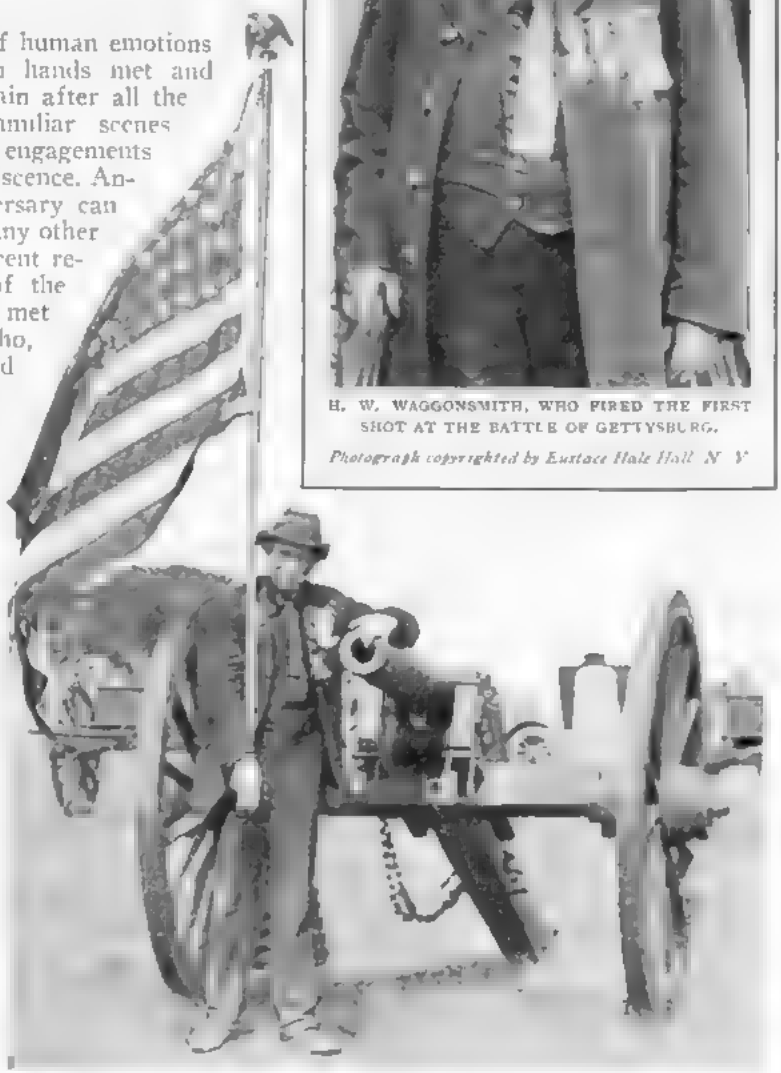
And the gray of the South had returned in the hair of the sons of the Confederacy

What torrent of human emotions burst forth when hands met and tongues spoke again after all the years — when familiar scenes were visited and engagements refought in reminiscence. Another such anniversary can never stir this or any other nation. In the recent reunion the men of the blue and the gray met as brothers who, since the war, had fought shoulder to shoulder to do their part in building up a great nation.

Here is the history of the battle of Gettysburg in a nutshell: Date: July 1, 2, 3, 1863. Union forces: 88,000 men, 410 guns. Confederate forces: 73,000 men, 190 guns Of the Union forces 3,072 men were killed, 14,497 injured, and 5,434 were reported missing Of the Confederate forces 2,592 were killed, 12,709 injured, and 5,150 missing.

H. W. WAGGONSMITH, WHO FIRED THE FIRST SHOT AT THE BATTLE OF GETTYSBURG.

Photograph copyrighted by Eustace Hale Hall N Y



WILLIAM J. WATSON CREATED MORE INTEREST THAN ANY OTHER CONFEDERATE SOLDIER AT THE GETTYSBURG REUNION. HE WAS ONE OF PICKETT'S DIVISION IN THE HISTORIC CHARGE, AND WAS THE FIRST MAN TO REACH SEMINARY RIDGE FROM WHICH POINT PICKETT'S MEN WERE DRIVEN BACK.

Photograph copyrighted by Eustace Hale Hall, New York

HULL OF THE SPANISH CRUISER REINA MERCEDES PHOTOGRAPHED AT HER DOCK AT ANNAPOLIS, MARYLAND FROM A UNITED STATES HYDRO-AEROPLANE GOING AT FULL SPEED AT AN ALTITUDE OF 350 FEET. THE SPECKS ON THE WHARF ARE HUMAN BEINGS.

CAUGHT BY CAMERA 350 FEET IN AIR.

HERE is a photograph which illustrates very vividly the potency of the aeroplane as an offensive instrument of war. It was taken by Mr. Niall Twigg, a member of the flying corps of the United States Navy, from the B-1, a navy hydroplane, maneuvering over Chesapeake Bay. The photograph was taken at an altitude of 350 feet. The battle-ship is the old Reina Mercedes, Admiral Cervera's flag-ship, captured in the battle of Santiago, the crisis of the Spanish American War. It has since been reconstructed, and she no longer bears any signs of the terrific bombardment she underwent during the victory which assured the supremacy of our country. Had the hydroplane been an accessory of our navy at that time, the entire Spanish fleet would have been wiped out or damaged beyond the hope of a real struggle by bombs dropped upon them from above. The small black spots in the picture are sailors. Just how clearly the hull was exposed to aeroplane attack is shown in the clearness with which the detail of the vessel was snapped by the camera.

SILENT GEARING POPULAR FOR FAST OCEAN LINERS.

THE "Citroen" system of gearing has been developed to give quiet running gears at high speed and under heavy duty. This has been developed to a point where 6,000 pairs of these gears are now running, some as fast as 4,000 feet per minute at the pitch line. The uses vary from the steering gears of the large steamships to heavy rolling-mill work, and they are to be tried out on the new turbine battleships, where four pairs will transmit 68,000 horse-power

From the days of hand-cut gears down to the present there is perhaps nothing in the way of machine work more interesting than gears and gear-cutting, says the *American Machinist* This is particularly true when there is a new problem to be solved in the way of special gears, both as to tooth curve and shape. The developments of the past few years in the helical and herring-bone gear, together with the methods of cutting them, make the gears of particular interest.

About twelve years ago, in 1900, to be more exact, André Citroen began making gears. While others have called them herring-bone type, he has so persistently named them "Citroen" gears that the name has been accepted as a part of the language in the countries now using them.

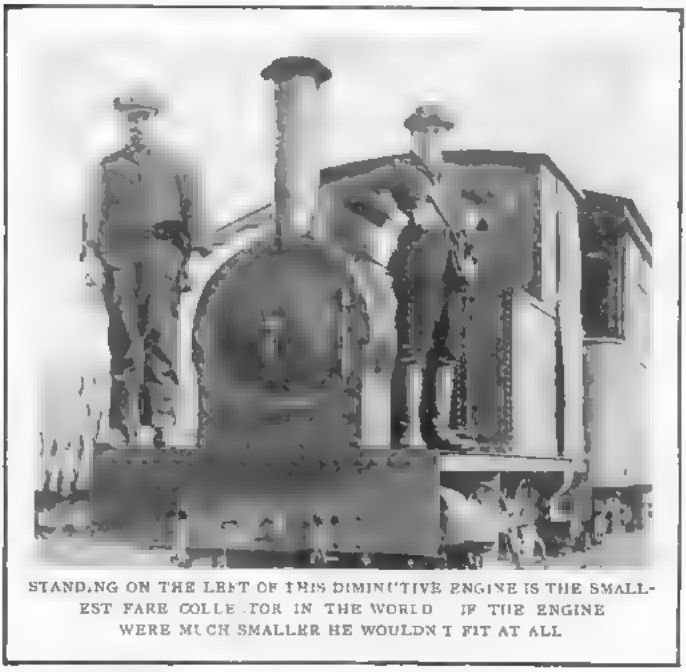
BOY AND GIRL "GUARDS" OF LONDON.

THE exploitation of impoverished children and their enslavement in mills and factories at wickedly low wages has aroused the indignation and opposition of the best minds in America. Though much has been done to obliterate the shame of it, it still exists. That the mental, moral, and physical development of thousands of children is thus arrested and perverted is an irrefutable fact which has only come to the serious attention of the public within the past few years.

Still, we do not stand alone as a nation that seems to be willing to put its children to work at an immature age England offers two really remarkable examples of child labor. They are shown in the accompanying illustrations. Both were discovered in the realm of transportation — on a bus of London's streets and on one of the large railroads. The young girl and youth shown in the photographs are probably the youngest children in the world employed as they are

It would indeed be a novel experience to be confronted by a young girl conductor on a trolley car or bus in America. And it, too, would be an astonishing innovation in American railroading to have trainmen, or "guards," as they call them in England, not more than fifteen years old.

ONE OF THE SIGHTS OF THE BUS TRAFFIC OF THE STRAND, LONDON, IS A GIRL CONDUCTOR, OR "GUARD" AS THEY ARE CALLED IN ENGLAND SHE SAYS THE WORK ISN'T TOO HARD FOR ONE OF HER SEX.



STANDING ON THE LEFT OF THIS DIMINUTIVE ENGINE IS THE SMALLEST FARE COLLECTOR IN THE WORLD IF THE ENGINE WERE MUCH SMALLER HE WOULDN'T FIT AT ALL

The young man in the picture is employed on a local passenger run between London and an outlying suburb. His rather distinctive uniform of military appearance makes him a striking figure on the train, and he has become very popular with the passengers. He has been offered positions of various sorts by merchants who ride over the line.

MONUMENT TO WORLD'S MOST DARING RIDERS.

THIS MONUMENT ERECTED BY THE
DAUGHTERS OF THE AMERICAN REVOLUTION
AND
THE CITY OF ST. JOSEPH
MARKS THE PLACE WHERE THE FIRST
PONY EXPRESS STARTED ON APRIL 3
1860

THIS STONE MARKS THE SPOT AT ST. JOSEPH MISSOURI WHERE THE FAMOUS PONY EXPRESS STARTED ON ITS FIRST WESTERN TRIP FIFTY-THREE YEARS AGO RELAYS OF MEN AND HORSES CARRIED MAIL AND NEWS TO THE PACIFIC COAST THE DISTANCE, 2 000 MILES, WAS MADE IN EIGHT DAYS SOME OF THE RIDERS WERE IN THE SADDLE 250 MILES A DAY

WHEN the discovery of gold in California lured from their homes in the East thousands of men who saw fame and fortune awaiting them in the new West, it was soon found necessary to blaze a westward way from St. Joseph, Missouri, from which point all emigration started westward over the boundless prairies.

As San Francisco, Virginia City, Nevada; Salt Lake City, Utah; Denver, Colorado, and other cities began to show signs of permanency it was necessary to establish a transportation service. A railroad then was out of the question; but the most daring business venture the country ever knew was organized for the purpose of carrying the United States mail and news across the continent. It was known as the Pony Express — relays of fast horses and daring riders. When it was put in operation the time for transmitting news across the United States was reduced from twenty-one days to ten days.

The adventures of the pony express riders are the basis of our most romantic Western literature, and a monument to their heroism has just been erected by the Daughters of the American Revolution and the city of St. Joseph, Missouri, on the spot from which the first pony express started on April 3, 1860

The ponies employed in the service were splendid specimens of speed and endurance; they were fed and housed with the greatest care, for they could not fail the test to which they were put.

Nearly two thousand miles in eight days had to be made. There was no idling for man or beast. The only delay at the relay stations was a second or two as the saddle-pouch with its precious burden was thrown on and the rider leaped into his place; then away they rushed down the trail and in a moment were out of sight

Two hundred and fifty miles a day was the distance traveled by the pony express, and it may be assumed the rider carried no surplus weight. Neither he nor his pony were handicapped with anything that was not absolutely necessary. Even his case of precious letters made a bundle no larger than an ordinary writing tablet, but five dollars was paid in advance for every letter transported across the continent. Their bulk was not in the least commensurable with their number.

The mail-bags were two pouches of leather, impervious to rain, sealed and strapped to the rider's saddle before and behind. The pouches were never to contain over twenty pounds in weight. Inside the pouches, to further protect their contents from the weather, the letters and despatches were wrapped in oil-skin before being sealed. The pockets themselves were locked and were not opened between St. Joseph, Missouri, and Sacramento, California.

CLOCK MADE OF 20,000 PIECES OF WOOD.

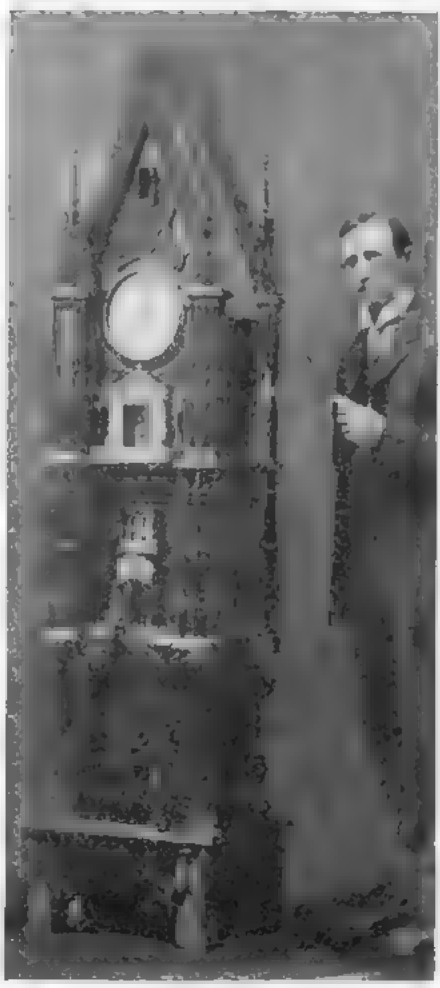
TWENTY thousand minute pieces of wood entered into the construction of the elaborately ornamented Notre Dame Cathedral clock made by James Calway, of Skowhegan, Maine. This three-story clock, which is finely carved, stands seven feet ten inches in height. It took Mr. Calway six long years to complete it, working night after night when his household was sleeping. Mr. Calway followed his own plans, which are entirely original

In the upper story six folding doors open every ten minutes and the apostles appear, marching in time to an air played by a large music box controlled by the clock, each one bowing before the Savior as they pass, except the fourth one, which represents Peter, who turns his back on the Savior, and the evil spirit comes out of the upper story of the clock and blows a trumpet in honor of Peter.

The second story is in the form of a mansion with double doors in front, which also open every ten minutes. Lazarus appears at the rich man's door and on bended knees asks for charity, the dogs licking his sores, while the rich man stands at the door, swinging his arm in representation of throwing crumbs from his table.

All these movable figures are run by machinery which is connected with a time-movement. The first story is a very handsomely designed foundation of fine inlaid work.

The clock is not only unique because of its construction, but because it is probably the only clock in the world that vivifies biblical history.



JAMES CALWAY OF SKOWHEGAN, MAINE, AND HIS 7-FOOT 10-INCH CLOCK WHICH HE BUILT BY HAND IN SIX YEARS FROM TWENTY THOUSAND PIECES OF WOOD

ARE YOU A HOUSEHOLD MECHANIC?

SOME of the greatest inventions originated in the household. The daily routine of the home suggests many things to save time and labor. Our patent records show that the busy housewife has given the world many of its most useful articles. Our Current Mechanics Department wants to get in touch with these practical inventions. Describe your invention in three hundred words or less, and send it to us with a drawing or photograph. Unless accompanied by stamps, manuscripts or drawings will not be returned. Address, Current Mechanics Department, The Frank A. Munsey Company, 175 Fifth Avenue, New York.

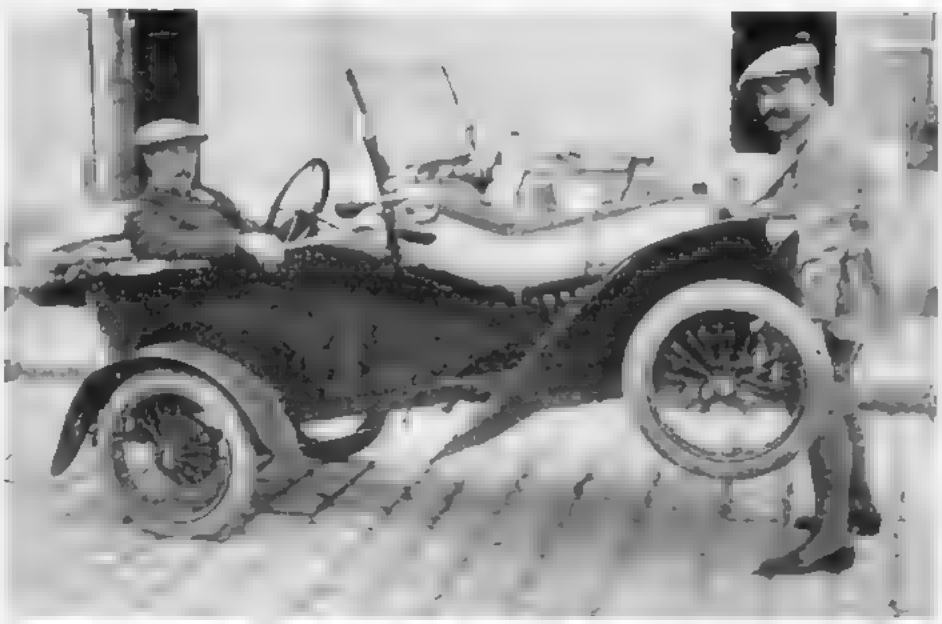
THE 'INVICTA' AN EARLY ENGLISH HOG THAT HAULED TRAINS ON THE CANTERBURY AND WHITESTABLE RAILWAY BEFORE THE "ROCKET" WAS PLACED IN SERVICE ON THE STOCKTON AND DARLINGTON. THE "INVICTA" WAS PRESENTED TO CANTERBURY AND SET UP AS A MONUMENT ON THE CITY PARK

Photograph copyrighted [illegible] and New York

"INVICTA," OLD-TIME HOG, NOW A MONUMENT.

THE "Invicta," one of the oldest engines in existence, now reposes as a monument in Canterbury, England. She was built in 1830 by George Stephenson. She had the distinction of being the first engine to haul a passenger-train between Canterbury and Whitestable. She was presented to the town council of Canterbury a few years ago with an imposing ceremony and people. Sir David Salomons, who made the presentation speech, declared that she was the first locomotive to be used in actual public service.

The "Invicta" carried cylinders 18 by 10 inches; her boiler was 40 inches in diameter, with a pressure of 40 pounds to the square inch. Her drivers were 4 feet high, with a total wheel-base of 4 feet 7 inches.



THE CYCLE CAR AS YET UNKNOWN TO AMERICA, IS CREATING A FUROR IN EUROPE IT COSTS VERY LITTLE, IS DURABLE FOR ITS SIZE AND IS SO LIGHT THAT A MAN CAN LIFT ONE END EASILY IT HOLDS TWO PASSENGERS COMFORTABLY

JACKS NOT NEEDED TO LIFT THIS CAR.

REMINISCENT of the early days of the "quad," which was developed for those of the motorcycling fraternity who were essentially gregarious, and of the old tri-car, which enjoyed a very short and not very popular existence in America, the cycle-car is the latest development in foreign automobiling circles. It is called a cycle-car because it is neither motorcycle nor automobile; it is something between the two. In England and France it is creating quite a sensation

It was in France that the little cars really originated, but not until England took them up were they considered seriously and given a name

According to the Royal Automobile Club of Great Britain, which keeps a watchful eye on everything that pertains to automobile sports across the pond, a cycle-car is a vehicle having either three or four wheels, an engine in which the piston displacement is not more than 1,100 cubic centimeters, and the weight complete not over 784 pounds

Everything that comes within this definition, excepting motorcycles, of course, is a cycle-car, and the variety in their design and construction is truly astonishing, considering the comparatively short time they have been on the market.

These cycle-cars have one or two air-cooled cylinders up forward under the hood. Of course, foreign roads are a great deal better than American roads, which accounts for the popularity of the little cars. Their treads are narrow, and for this reason they can travel over roads that are closed to the full-sized automobile

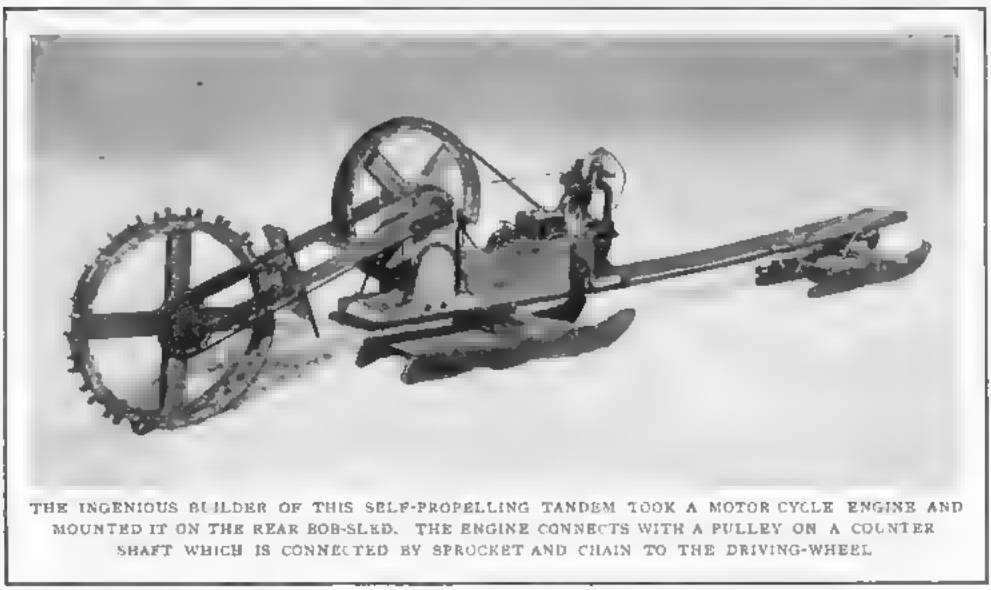
Because they are light their owners and drivers have no fear of sand or mud, for if they get stuck—Presto! the car can be lifted out of its difficulty

These little cars are not makeshifts, nor are they toys. They are real automobiles, built for service. In fact, both the French and German governments have taken them up quite seriously for the use of their respective armies. They are so small that they skim over the roads almost unnoticed, where a larger vehicle would be either seen or heard long before it came within effective range of the enemy.

The original idea in bringing out the cycle-car was to place on the market a light, cheap vehicle—particularly a cheap one—though, judged by the really good American cars that can be purchased at a small cost, the manufacturers have not been very successful.

The average price of the typical cycle-car, without lamps, horn, and tires, is approximately $8[illegible]

BOB-SLED MOTOR-CYCLE MAKES TWENTY MILES AN HOUR.



THE INGENIOUS BUILDER OF THIS SELF-PROPELLING TANDEM TOOK A MOTOR CYCLE ENGINE AND MOUNTED IT ON THE REAR BOB-SLED. THE ENGINE CONNECTS WITH A PULLEY ON A COUNTER SHAFT WHICH IS CONNECTED BY SPROCKET AND CHAIN TO THE DRIVING-WHEEL

ARTHUR JEWETT, of Skowhegan, Maine, has recently perfected a double-runner motor-cycle combination that is an object of envy among the youngsters of that town. He took the engine from the regular motorcycle and mounted it on the rear end of his bobsled. The engine is bolted to a large pulley on a countershaft, and the latter is connected by sprocket and chain to the driving-wheel. The driving-wheel is set in the rear end of a movable frame pivoted on the countershaft so that it rises and falls to readily cover all inequalities in the road. The rim of the driving-wheel is studded with sharpened steel calks, so as to get a firm grip in the snow. Mr. Jewett's auto-sled can make about twenty miles an hour. It will take a grade at a lively clip.

HOW THE CHINESE READ MORSE.

CHINA was confronted with a stiff problem with the introduction of the telegraph. It was hopeless to think of combining Morse dots and dashes in sufficient variety to express the four thousand characters used by a fairly literate Chinese, not to speak of the entire forty thousand or so known to the highly educated men of that race. A phonetic system was barred by the fact that the same Chinese monosyllable means different things according to the context or intonation and also by the diversity of dialects. Professor Schellerup, a Dane, found the solution. The seven thousand characters most commonly used are given their equivalents in a code of numerals, and these numerals are telegraphed. Thus "cash" in the code is "6030." If any one wanted to telegraph the number "6030" itself he would send the code equivalents of the words "six," "thousand," and "thirty."

NATURE

Unusual Stories and Photographs of the Great World of Outdoors.

HOW A CAT DRINKS MILK FROM A BOTTLE.

THE late Carl Hagenbeck, who, perhaps, knew more about training animals than any other man of recent times, once told the writer that the ordinary domestic cat was the most difficult of all animals to make perform tricks. In his day Mr. Hagenbeck dealt with elephants, lions, tigers, and other wild beasts of the jungle. He also trained horses and dogs to do some of the most wonderful stunts ever performed.

"It is not that the cat lacks brains, but its temperament is such that it is very difficult to engage it for a sufficient length of time to do something out of the ordinary. Of course, food plays an all important part in the training of any animal. In this respect they are very much like some human beings—play to their appetite and you win them over. But the cat does not seem to care whether she is to be fed or not. I have tried to train domestic cats of different breed and must admit they are the most difficult to handle of all animals.

THOMAS THE FAMOUS CAT OF DORCHESTER MASSACHUSETTS, WHICH LEARNED TO DRINK MILK FROM A BOTTLE JUST LIKE AN OLD TOPER, AFTER FOUR MONTHS OF DAILY TRAINING.

Photograph by Frank E. Evans & Co. New York

SUSIE, THE ACROBATIC CHIMPANZEE OF THE NEW YORK ZOOLOGICAL GARDENS. JUMPING FROM A CHAIR PLACED ON THE TOP OF A TWELVE-FOOT LADDER INTO THE ARMS OF HER KEEPER, A DISTANCE OF TWENTY FEET.

Notwithstanding Mr. Hagenback's interesting views in this matter—views based on years of constant animal training we are able to produce on page 89 a photograph of a tom cat in Dorchester, Massachusetts, actually trained by a boy to drink its milk from a bottle. Thomas squats on his haunches, takes the bottle in his forepaws, and tips it back like an old toper. It took four months of patience and hard work to teach Thomas this trick. When he learned that the bottle contained the life-giving lacteal fluid which all cats prize, Thomas became a very apt pupil.

APE JUMPS 20 FEET.

STANDING erect on a chair perched on the top of a twelve-foot ladder and dressed in regulation gymnasium bloomers, Susie, the little chimpanzee, for whom the New York Zoo would not take $5,000, leaps through the air straight into the arms of Fred Engelholm, her keeper, as many times a day as he is willing to play his part in the game. It is not an easy matter for Mr. Engelholm, for the little chimpanzee goes through space so fast that the man who took the pictures had to speed up the shutter to one-thousandth of a second.

Susie was captured about three years ago by Professor R. L. Garner in French Congo, South Africa. She was only a month or so old at the time. Ever since she was separated from her tree-living, primitive relatives she has been instructed in the ways and habits of human beings. She understands human speech to a remarkable degree. She has been taught to distinguish colors and her code of table manners is of the blue book order. She is also able to spell her name by means of alphabet-blocks and will not help herself to candy without first passing the box to her visitor.

INGENUITY OF ANTS.

MOST varied of all insects in cleverness is the ant. Many are the wonderful stories reported by scientists who have watched these tiny creatures. Here are some new ones:

According to Professor Wilhelm Neiger, of Dresden, there is a species of ant which actually makes and bakes bread. This kitchen specialist or baker ant—its scholarly name is *messar barbarus*—hails for the most part from the neighborhood of Dalmatia. Not only are these ants skilful cooks, but they cut the wheat or other grain, harvest it, make it into dough, and then bake it into bread.

After the worker ants have garnered the cereals, they gather the seeds, rush them into their underground granaries for the queen ants to inspect. Here the grain is kept until it germinates. After the tiny leaves have appeared it is transported into the sunlight until quite dry. The busy little ants may then be seen transporting the germinated seedlings back into the underground granaries, where the worker ants again get busy and chew them into dough.

Here another ingenious step is taken by these ants. They literally form the dough into miniature biscuits, loaves, and cakes. These are placed in the sunlight at oven-heat, when the bread, cakes, or biscuits are dragged back into

their storehouse for future use. There is also a small spider, with long, filmy legs, that is so "light on its feet" that it can walk on water, awaiting a favorable moment

to pounce upon an unwary gudgeon, drag it to shore, and devour it.

But spiders are by no means the only creatures that seem endowed with levitation. Dr. John C. Willis, of the *Jardin Botanico*, Rio de Janeiro, reports to a scientific journal that he was much interested recently in studying the common house ants and their remarkable behavior in water.

He had an ordinary American fly-trap filled with sugar. One day he noticed that the sugar was covered with ants. He at first intended to wash the ants away, so he stood the fly-trap with the horde of ants in a finger-bowl which rested upon a plate filled with water

No sooner had he done this than the ants gave evidence of panic. They rushed hither and yon, to and from the edge of the water and around the bowl Finally, after several mad attempts to find a dry exodus, they evidently became convinced that there was nothing to it but to get across on the water.

Dr. Willis was completely dumfounded when they began to run across the surface of the water. It is by the aid of the surface tension or top film of water that ants and other insects are able to walk upon the waters without so much as dampening their heels.

But Dr. Willis's ants were not content merely thus to tempt fate and rush home to their nests. After they had overcome their riotous flight and, presumably, gone home to their queen and nest, they returned for more sugar and crossed in the same way they had escaped. This was kept up by a steady double procession, which crossed and recrossed back and forth over the water between the island fly-trap and *terra firma*, each ant carrying home a grain of sugar.

A wonderful species of ingenious ant is found in Colombia, South America. They are known as mushroom cultivators. Their homes are very large, being sometimes as much as five or six feet deep, three feet wide, and containing large

recesses, in which the mushrooms grow. The passages leading to these chambers are about an inch wide, while the chambers themselves are seven or eight inches in diameter.

The workers carry into their home small leaves bitten from plants. These leaves are pulverized until they become flocculent and exude a certain amount of sap. While the workers are so engaged the larger ants of the colony, soldier ants, guard the entrances and occasionally make visits to see that the work is progressing properly.

Armed with exceptionally large jaws, they are equipped to punish any offenders.

So powerful are their jaws that they will draw blood. The natives use them to heal wounds. The ant is grasped in the fingers and held against the edges of the wound. In anger the insect bites and holds on. The native then twists the head from the body, and the jaws, remaining firmly clinched in the wound, serve to hold the edges together so that they heal. The mushrooms on which the ants live grow in the large chambers

It was once said that one species of ant raised what was called "ant-rice," but this has since been denied by several noted authorities on ants.

HUMAN SLEDS OF SWITZERLAND.

IN the mountainous sections of Switzerland, where the snow falls early, keeps the ground white all winter, and does not melt until late in spring, the peasant folk indulge in a rare and thrilling sport commonly known as "coasting on human sleds." The sport is indulged in by both men and women. Two people lie flat on separate sleds and are ridden tandem by a third. The rider guides the "sled" with reins attached to the forearms of the other two. This is very necessary, because the two human beings forming the sled must remain perfectly rigid.

The mountain roads in Switzerland are very steep and are frozen to a depth of five or six feet. Experienced coasters start at the top of the mountain and make a dizzy descent of from three to five miles. The coasters attain a high speed and have been known to make seventy miles an hour. The curves on the roadways are banked high on the outside, and it is a thrilling sight to see a coaster take a sharp bend almost perpendicularly and dash back to the straight road at a speed that would defy a meteor. Several Americans who tried this sport last year were killed.

A "HUMAN SLED" READY TO MAKE ITS START DOWN A STEEP GRADE IN THE SWISS ALPS. THESE COASTERS MAKE THE DESCENT OF FOUR OR FIVE MILES AT A SPEED THAT SOMETIMES REACHES SEVENTY MILES AN HOUR.

Photograph by Henry Rushin New York

GRAVE OF THE WORLD'S OLDEST FISH STORY.

THERE was a man in Los Angeles a few years ago who owned a gold fish to which he attributed, if not human intelligence, human emotions. He claimed that it came to the surface of the aquarium every morning to have him scratch its back, after which plebian caress the little creature would sink to the bottom with a contented smile.

This man was a special writer on a noisy newspaper, and his duties finally called him away from his fish for two weeks. During his absence it languished for its daily scratch, grew morose, refused all nourishment, died.

All of the above according to the man He said he could prove it by showing the dead fish. Which was a strong point in his favor, as all true fishermen will allow.

It is the troublesome thing of proving the essential fact that makes it so difficult for fishermen to establish their cases before the bar of public judgment. The *corpus delicti*—one may go that far in speaking of fish stories—is most generally wanting, for it is only the occasional fisherman who is as lucky as the Los Angeles man.

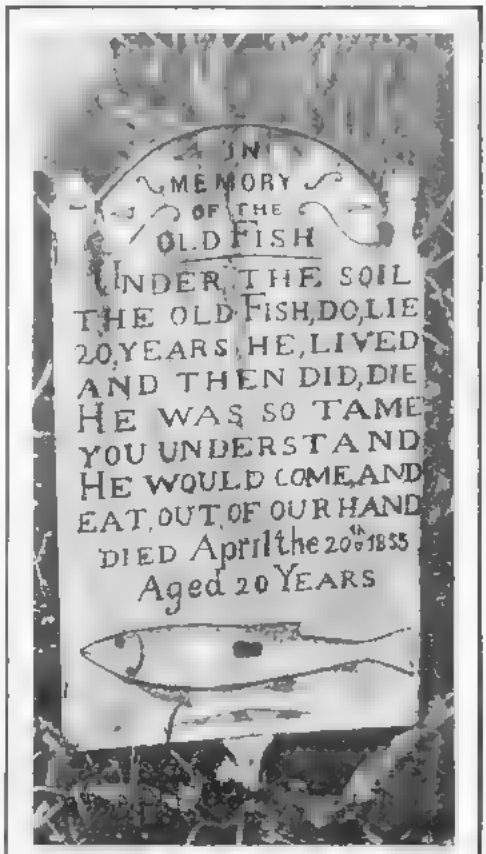
The Wisest Trout

And it is due to this absence of proof that fish stories are so unstable and evanescent. They come and they go and are forgotten. If we should set up stones to mark their demise, as they have done over a notable yarn in Brockley, Worcestershire, England, we shouldn't be able to get around.

The stone above the grave of "the old fish," pictured on this page, marks the resting place of the most ancient fish story of which there is trustworthy record. There is nobody alive in Brockley to-day who was personally acquainted with the wise trout, but everybody in the town knows the story of his excellent qualities and circumspect deportment.

Twenty years was the length of the life that he lived, and he lived it with honor to his birthplace and credit to English fish and Englishmen.

"But how do you know?" asks the visitor in Brockley.



BENEATH THIS HEADSTONE, AT BROCKLEY ENGLAND LIES THE SUBJECT OF THE FIRST PISCATORIAL PREVARICATION. HE WAS BURIED IN 1885. HE LED A SIMPLE LIFE COMPARED TO SOME OF THE FISH STORIES THAT HAVE BEEN TOLD SINCE THEN

"We knows," answers the bearded native. "becorse there's the stone above 'im, sir." He stoops, tracing the inscription with his finger. "'E was so tame 'e'd heat hout of your 'and," he reads.

What more can you ask?

There's the enduring stone, with the history of the old fish carved upon it; and there, beneath the inscription, is the picture of the old fish himself. Who is going to question the authenticity of the portrait; who can challenge the truth of the likeness?

It was a good fish, and a good story of its kind, and no honest fisherman will be so ungenerous as to envy both of them the unique distinction of a properly marked grave.

LARGEST AND SMALLEST OF ALL HIPPOS.

A REMARKABLE contrast of wild-animal life is shown in the two illustrations, representing a giant hippopotamus and a pair of dwarf hippos. In bulk it would require forty of the pygmies to equal the enormous size of their monster relative. Caliph, the mighty creature here pictured, was the leading center of attraction at Central Park menagerie, New York City, for twenty five years. The great beast was the largest and most celebrated of his species in the world being fourteen feet long. An idea of his huge size may be gleaned from the group of thirteen children massed around his mounted figure.

In his special hunt for these creatures on Lake Naivasha, British East Africa, Theodore Roosevelt did not secure a specimen approaching the extraordinary size of Caliph.

The hide weighed 1,200 pounds when first removed from Caliph's body. In some places it was eight inches thick. It was shaved down to only sixty-eight pounds for final use. This required the service of six men for four days. The hide contained one hundred square feet of surface.

This famous hippo was captured on the River Nile when he was four years old. He was bought for $6,000 when about twenty years of age by the Central Park menagerie. He died of acute indigestion a year ago, at the age of fifty years. In life he weighed nearly 8,000 pounds.

The first pair of pygmy hippos ever caught and brought into civilization recently arrived at the New York Zoological Park. They were captured in the remote interior of Liberia, West Africa, by a venturesome explorer and hunter for the late Carl Hagenback, from whom they were purchased. They cost $12,000 It is claimed that the animals are fully grown. The female stands eighteen inches high at the shoulders and weighs 176 pounds. The male is a trifle larger and heavier. Pygmy hippos are among the rarest and most wonderful of the wild animals of Africa. The intrepid

THE STUFFED BODY OF CALIPH, THE LARGEST HIPPOPOTAMUS EVER IN CAPTIVITY. HE WAS FOURTEEN FEET LONG AND WEIGHED FOUR TONS. HE DIED A YEAR AGO IN THE CENTRAL PARK ZOO NEW YORK, OF ACUTE INDIGESTION.

Photograph by Walter L. [illegible] New York

THE FIRST PAIR OF PYGMY HIPPOPOTAMI EVER PLACED IN CAPTIVITY. THESE RARE ANIMALS WERE CAPTURED IN THE INTERIOR OF LIBERIA, WEST AFRICA. THEY WERE PURCHASED BY NEW YORK CITY FOR ITS BRONX ZOO FOR $12,000. THEIR COMBINED WEIGHT IS LESS THAN FOUR HUNDRED POUNDS.

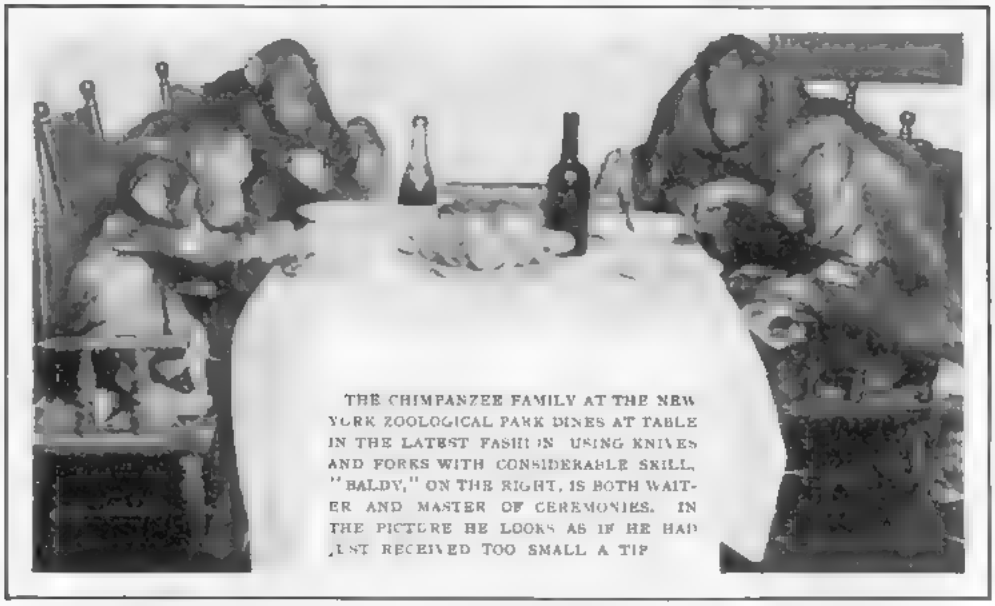
Photograph by Walter L. Beasley, New York.

explorer, with a caravan of one hundred men, penetrated the dense Liberian forests two hundred miles from the coast to capture these shy and secretive animals. After many months of hardship and continual hunting the pygmy hippos were located on the upper Lofa River, a remote and unknown territory far from human habitation. About a hundred pits were dug in various places to trap them. These pits were seven feet deep and covered so that the sharpest eye could not detect any signs of danger. After a long wait the animals now in Central Park, New York, were captured.

The difficulty in catching pygmy hippos alive is that, unlike their big cousins, they do not frequent rivers. They make their home in some deep, inhospitable forest or in the dense vegetation along the banks of small forest streams. Not satisfied with the protection the forest affords them, they burrow under the banks until they are absolutely hidden. Then they sleep during the heat of the day.

DINNER AT THE ZOO.

THE latest and smartest exhibition of wild-animal table manners is the dinner for chimpanzees served daily at the New York Zoological Park. It is no deception, but a genuine and successful demonstration of the mental traits and capacities of wild animals. All the



THE CHIMPANZEE FAMILY AT THE NEW YORK ZOOLOGICAL PARK DINES AT TABLE IN THE LATEST FASHION USING KNIVES AND FORKS WITH CONSIDERABLE SKILL. "BALDY," ON THE RIGHT, IS BOTH WAITER AND MASTER OF CEREMONIES. IN THE PICTURE HE LOOKS AS IF HE HAD JUST RECEIVED TOO SMALL A TIP

diners show a certain regard for etiquette and use a fork in most approved fashionable manner. The knife is tabooed.

The dinner proceeds smoothly and with considerable anthropoidal dignity. The simians, forgetful of their hustle for rations in any old way in the forests of equatorial Africa, sit and eagerly await the word of the keeper to begin the meal. After all the plates have been piled up with portions of cut bananas, the command, "All right! Dinner is ready!" is shouted.

Instantly each fingered paw grasps a fork and the fruit is deftly conveyed to the masticating cavity.

"Baldy," the master of ceremonies and head waiter, shown on the right of the picture, keeps a watchful eye. If any of his unthinking companions drops a fork to use his primitive paw this gross breach of etiquette is punished by a vigorous punch on the left jaw and this giant ape's husky arm can deliver some blow. It is not without effect this wonderful punch. Simian table manners have been mooted quickly in recent years, and the famous monkey dinners of a fashionable watering-place have never been forgotten.

However, a wallop on the jaw by a husky ape should make even one of his own species observe some degree of politeness

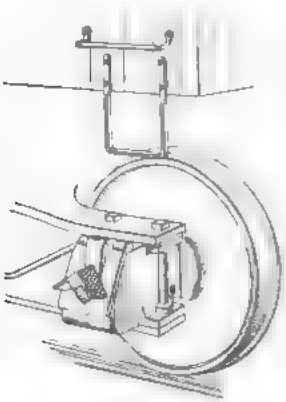
A great hubbub at the table usually arises, but it soon subsides and the offender proceeds more carefully. When one or two apes have been trained to perform tricks or sit at table without soiling the cloth or handling too large a quantity of food with his paws, it is not so difficult to train others, for the animals are great imitators and learn from one another.

CURIOSITIES CAUGHT BY THE CAMERA

IF you are a camera fiend here is a chance for you to sell your photographs and make your camera a paying investment. We want odd, unusual, and curious photographs of all sorts; photographs that are interesting because they are out of the ordinary. Submit whatever pictures of this description you take anywhere. Unless accompanied by stamps, photographs will not be returned. Address, Current Mechanics Department, The Frank A. Munsey Company, 175 Fifth Avenue, New York.

What the INVENTORS Are Doing

MANY brakemen lose their lives because the hanger and ladder with which freight-cars are equipped are rather high above the ground, and the men frequently take chances in trying to mount them while the car is in motion. Such practises are, of course, extremely foolish and often unnecessary To mitigate the danger of such accidents, Ancel L. Neale, Leonard, Texas, has invented a safety step which, he claims, will practically eliminate the possibility of these mishaps. His invention is very simple, for it consists of nothing more than substituting a corrugated surface on the journal box instead of the ordinary smooth surface. It is difficult to secure a firm foothold on the smooth metal box, but the corrugated surface will supply some purchase to the leather sole of the shoe, and the possibility of slipping will be greatly decreased. The box is located beneath the hanger.

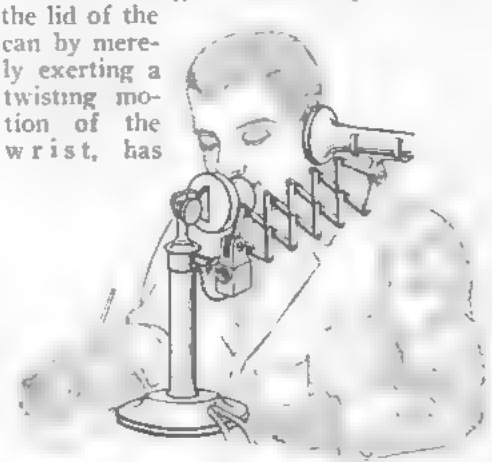


SAFETY STEP FOR FREIGHT-CARS. THE JOURNAL IS FITTED WITH A CORRUGATED SURFACE TO PREVENT A BRAKEMAN'S FOOT FROM SLIPPING.

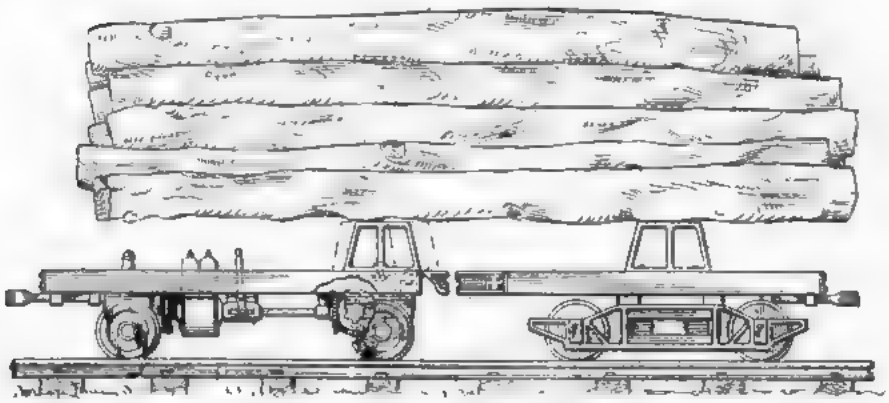
A NEW telephone attachment to render unnecessary the use of hands in sending or answering messages has just been invented by Simon J. Heimbuecher, Pittsburgh, Pennsylvania. It is shown in the drawing in the lower right-hand corner of this page and, as appears from the picture, is merely composed of a series of toggle joints which can be adjusted at the proper distance from the ear, so that both hands may be free to make any notes or memoranda. The attachment is provided with a small plug which holds the receiver in an inoperative position when it is not in use. To send or receive a message it is only necessary to remove this small plug, and the receiver-hook is immediately raised to an operative position by the spring.

JOHN T. WILLIAMS, Sans Souci, North Carolina, has invented a new gasoline truck for moving freshly felled trees in lumbering districts. As shown in the picture at the top of page 98, it consists of two four-wheeled trucks and cars, one of which is equipped with a gasoline motor to supply power. Each car is also fitted with a bolster to carry the logs, so that they will not roll off or be thrown off by centrifugal force.

A NOVEL can-opener, which cuts a clean edge and entirely removes the lid of the can by merely exerting a twisting motion of the wrist, has

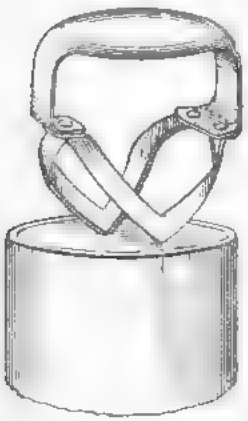


TELEPHONE RECEIVER WHICH PERMITS YOU TO OTHERWISE USE BOTH HANDS WHILE CALLING YOUR NUMBER AND WAITING FOR AN ANSWER.



LOGGING TRUCKS FITTED WITH GASOLINE MOTORS, FOR TRANSPORTING TIMBER FROM THE SAWMILL TO THE RAILROAD.

been invented by Thomas T. Lecroy, Lonsdale, Arkansas. The handle, as shown in the accompanying drawing, resembles that of an ordinary flat-iron and is fitted with two blades, somewhat semicircular in contour and sharpened to a cutting point at the bottom. These blades can be adjusted to fit any ordinary can, and by merely pushing the points through the lid and turning the handle the lid is cut out

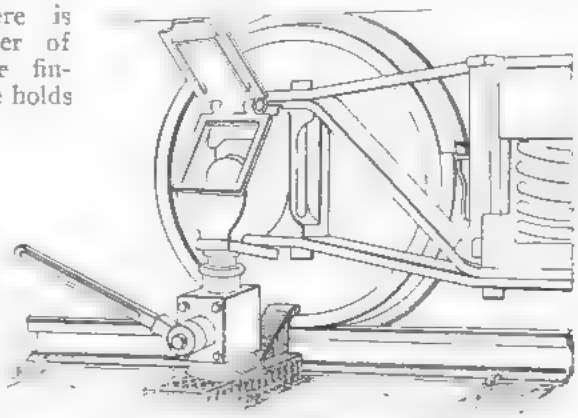


TURN THE HANDLE AND THIS CAN OPENER CUTS CLEAN THROUGH THE LID.

With such a device there is little danger of cutting the fingers, as the pressure of the handle holds the can firmly.

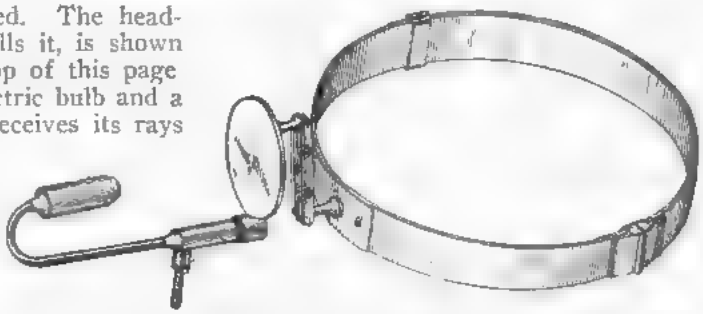
JAMES A. GRAY, Cœur d'Alene, Idaho, has invented a jack-block to hold the wheel of a car to the rail in jacking up the journal-box, as when removing and replacing or renewing the journal bearings or brasses, and consists of a relatively long, thick hollow block, having an upper flat face to seat the jack, with the under side of the block constructed to seat flat at successive points throughout its length on the end of a railroad sill, and a toe arranged at an elevation above the bottom of the block to engage the wheel when the block is seated on the rail sill, and having a foot rigid with the upper face of the block, this toe being arranged to extend outwardly from one end of the block, whereby when the toe is in operative position to the wheel the length of the block will be extended in the direction of the length of the sill.

FOR the use of physicians and surgeons in making examinations of the nose, throat, and teeth, a special light and reflector, which can be fastened about the head in such a position that these examinations are made much



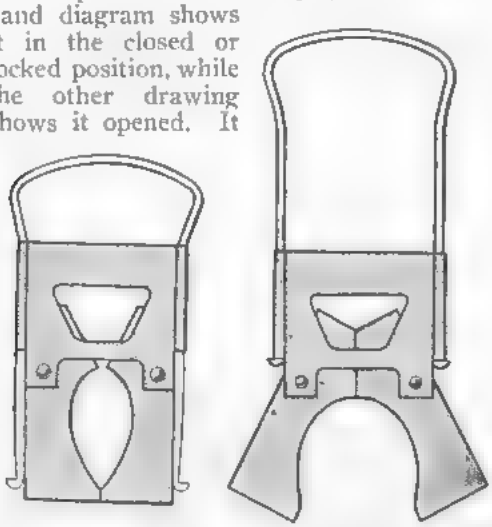
A JACK WHICH HOLDS THE WHEEL OF A CAR TO THE RAIL WHILE RAISING THE JOURNAL BOX

easier, has been patented. The headlight, as the inventor calls it, is shown in the drawing at the top of this page. The light of a small electric bulb and a concave mirror, which receives its rays and reflects them upon the object being examined.



ELECTRIC LIGHT FOR DENTISTS AND DOCTORS FOR EXAMINING THE NOSE, MOUTH, AND TEETH. IT IS FASTENED ABOUT THE HEAD BY THE STEEL BAND

TO hold clothes fast to the line and prevent them from blowing away, as is often the case when ordinary clothes-pins are used, Frank Comeau, Louisburg, Nova Scotia, has invented the lock clothes-pin shown on this page. The left-hand diagram shows it in the closed or locked position, while the other drawing shows it opened. It



LOCKING CLOTHES-PIN TO PREVENT CLOTHES FROM BLOWING AWAY. THE LEFT HAND PICTURE SHOWS IT CLOSED AND THE RIGHT OPEN. IT IS OPENED AND CLOSED BY MOVING THE WIRE HANDLE UP AND DOWN

is held in position by a spring, and when closed over the clothes and line it holds them firmly together. It is closed by merely pushing down the wire loop or handle.

THE cigar protector shown in the accompanying drawing is made of a tube of wire netting that may be fitted to the cigar by means of a spring clamp. The inventor claims that with this apparatus it is possible to smoke a cigar while driving a motor at a high speed with as much comfort as if in a room fully protected from the wind.

NOT long ago a small body of men met in a New York hotel and, after a banquet, discussed for several hours the possibility of forming an association of inventors for the protection of an inventor's interests in his patents.

It is, of course, undeniable that most atrocious thefts of valuable ideas have often occurred. Creators of devices which have made others rich have died in poverty because they have been stripped of the benefits of their own genius.

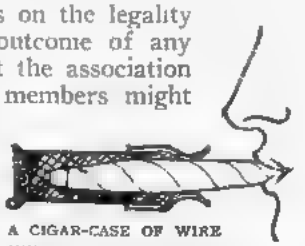
Fully aware that they had been defrauded, they were unable to proceed for legal restitution because of lack of funds to carry on a protracted lawsuit.

If an association of inventors could be molded on sane policies, it would be a fine step in many ways. Just what to do would require the most careful consideration to meet exigencies which such an association would probably confront.

Money would, of course, be the foremost essential to make it effective in its purpose. The best way to obtain this money and to maintain a sufficient fund for the organization's many uses is a serious question.

It would also be necessary, naturally, to have the available services of able attorneys to pass on the legality and probable outcome of any proceeding that the association or one of its members might begin against an alleged infringement.

The advantages of a united order of inventors are obvious.



A CIGAR-CASE OF WIRE NETTING WHICH MAKES IT POSSIBLE TO ENJOY A CIGAR WHILE MOTORING AT HIGH SPEED

Told by Our Readers

HUNTING BIG GAME WITH A LOCOMOTIVE.

Canadian Railroad Men Have Many Thrilling Adventures with Moose and Other Animals That Stray Too Near the Right-of-Way Through the Wilderness.

BY ROBERT E. PINKERTON.

WE will pay promptly for railroad and telegraph stories for THE RAILROAD AND CURRENT MECHANICS—stories of danger and daring; of mystery, romance, and wonder in the big world of railroading. We want to publish these stories in "Told by Our Readers," and we want our readers to write them. Just sit down and tell the story as it happened—as if you were telling it to a smoking compartment full of good fellows and had them "all ears" to catch every word. Tell it as if you were telling it to your wife and children at home. We want just such stories—true ones, with names, dates, and places, and running from one thousand to two thousand words in length. Checks will be mailed immediately upon acceptance.—THE EDITOR.

HUGHIE McDONALD, the district constable, and I, were talking in front of the little general-store.

"Last week I killed two moose and a deer," some one behind me said.

Hughie, whose duty it is to arrest violators of the game laws, did not even turn his head, although he had heard. I knew some people killed moose and deer out of season, but I did not think any one would boast of it openly, especially in the presence of the law. But Hughie went on talking, and I turned to look at the man who had spoken.

He wore the black cap, black sateen shirt and overalls of a trainman. He was talking to the clerk in the store.

"I got the two moose together down this side of Banning," he went on. "I threw on the air, but they stuck between the rails and wouldn't travel fast enough to get out of the way. The pilot nipped one on the heels, and they hurried a bit, but the next minute I hit them both. I hated to do it, but I couldn't stop. The deer? He never knew what hit him. He stood and stared at the headlight, never moving a step."

The engineer went over to the roundhouse, and Hughie kept on talking. As soon as I could I turned the conversation to moose and the railroad. Hughie would know, for he had been in the country long before the railroad. He was manager of the Pioneer Hotel at Atikokan, Ontario, and the trainmen were known to him from Port Arthur to Rainy River.

In a Real Wilderness.

For Atikokan is a division point on the Canadian Northern Railroad. One division stretches one hundred and forty-six miles east to Port Arthur, and the other as far west to Rainy River. The town looks as if it had been dropped off a fast freight, the only buildings are the hotel, store, roundhouse, bunkhouse, station, and a few small frame dwellings. There is nothing particularly promising about Atikokan, but it is in the midst of what is undoubtedly the greatest moose country in the world.

Maine nor New Brunswick never knew so many moose. The railroad penetrates a wild region in which moose and other animals of the forest share the land only with the Indians.

Sixty miles north of Atikokan is the Canadian Pacific Railroad, and far to the south, more than one hundred miles, are the northern settlements of Minnesota. For nearly two hundred miles the Canadian Northern bisects this wilderness, and, except on the railroad, there are no inhabitants save Indians. Here and there a lone prospector paddles from lake to lake. In some districts near the railroad are a few lumber camps.

Stations Named for Indians.

The country is wild and forbidding. The great Laurentian shield has laid a heavy hand upon the land, and there is no room for the farmer's plow. Forest-fires in the last few years have destroyed much of the best timber, and the vast territory is destined to remain what it is to-day—a home for the wilderness animals and for the few who are adventurous and hardy enough to seek them.

In the summer a few canoeists travel down the rivers and across the lakes; but the district, though so close to civilization, is practically unknown.

Mines have been started, but only two or three of the dozens of twenty years ago are still running. The places marked towns on the map are nothing but a telegraph-station, a section-house, and, here and there, a tank and pump-station. Every fifty miles or so there is a store and a hotel. Otherwise the wilderness remains uninhabited except for the Indians.

From the Indians the stations derived their names. Atikokan is Ojibway for caribou horn, the original being "ah-teek," or caribou, and "ko-kan," meaning horn or bone. The Ojibway accents the second and fourth syllables, but the white man applies his own pronunciation. There are Kashabowie, Kawene, Kabaigon, Keego, Windigo, Abiwin, and many others.

Trainmen See Many Moose.

The moose begin to be numerous just north of Tower and Ely, more than one hundred miles to the south in Minnesota. They increase in numbers as the border is reached. On one lake near the border I counted fifteen in sight at one time. The next day I saw forty-one. On a four-day canoe trip I saw eighty-one, and last summer a total of one hundred and seven.

Each year the moose become more numerous, and there are now many red deer along the railroad track, although before the coming of the steel there were few if any. The deer, unlike the moose, like to have white men about. It means fewer wolves. The huge "monarch of the forest," who frequently stands from seven to eight feet high at the shoulder, is seldom molested by the gray fellows.

Water lily roots, stems, and pads are the principal food of the moose in summertime. The great animal is almost an amphibian. He will swim for hours, wade through mud that would mire any other living thing, dive and remain under water from a minute to a minute and a half, and frolic about in the early morning like a colt in a pasture.

The railroad follows many lakes and streams. In June and July trainmen see countless moose. The animals have become so accustomed to the noise that they seldom lift their heads when a train passes.

Headlight Fascinates Them.

But at night the trains are dangerous. The glaring light of the locomotive seems to fascinate them. The railroadmen believe it does; but old hunters know that a moose, when there is danger, endeavors to stay in the light.

When the big headlight of the locomotive catches them as they are crossing the track, they remain in its path, generally between the rails, and are either killed or finally driven off.

Any of the engineers on the two divisions out of Atikokan can tell stories of moose slain by trains. Daniel Malcolm, John Meehan, D. A. McKenzie, Lorne Campbell, Lorne Dohm, David McKenzie, David Johnson, George Campbell, Neil Campbell, John Callan, Herbert Mills, and others have bagged their big game with the pilots of their locomotives.

Hughie McDonald estimates that twenty-five moose are killed annually by trains in the two hundred miles of track of which Atikokan is the center. The road has been in operation ten or twelve years. Even if there are only twenty killed each year, and that is a conservative estimate, it means that between two hundred and two hundred and fifty moose have been killed by trains. The number of deer is comparatively very small.

Passenger-Trains Kill Many.

Passenger-trains are the greatest slaughterers. They travel much faster, and frequently round a curve to find one or more moose directly in front of them. The engineers do not like the slaughter, and endeavor, where possible, to avoid killing the animals.

They "give her the air," but the speed of the trains often makes it impossible for

a moose to get under way. Last summer an engineer saw two bulls, a cow and two calves between the rails ahead of him. He slowed down and the moose slackened their pace. They kept between the rails for more than half a mile and then turned off into the bush.

Most of the engineers, when they see that a collision is unavoidable, jerk open the throttle and strike as hard as they can in an endeavor to throw the moose from the track.

Calves Easily Tamed.

Several years ago Engineer John Meehan was waiting at a siding for a passenger train. D. A. McKenzie, now an engineer, was his fireman. A cow and two calves came out of the brush near the engine. The engineer and his fireman climbed down and caught the youngsters. This is not a difficult feat. The long-legged, ungainly calves are easily tamed.

The enginemen took them into the cab and carried them to Atikokan, where they were kept overnight and then shipped to Port Arthur, Meehan's home. They died before he had received permission from the government to keep them.

Moose and deer are not the only game that fall before the locomotives. Hundreds of rabbits are killed. The little fellows sit between the rails and do not try to escape

Allan McKenzie, a freight conductor, running between Atikokan and Rainy River, was riding on the pilot one day when a rabbit, leaping fifteen feet at a spring, jumped between the rails and dashed ahead of the locomotive. Immediately after it was a large lynx. They dashed on directly ahead of the engine, until the rabbit finally turned off into the brush, the lynx following. McKenzie says he believes neither knew the train was behind them.

Last summer, when riding on a freight, the head brakeman, a boomer shack whose name I have forgotten, entered the caboose and asked if I had seen the deer. He had been riding on the pilot. On rounding a curve he saw a deer between the rails The deer turned down the track ahead of the train, but was quickly overtaken.

The brakeman climbed up to the runningboard, for he knew it would be disastrous to him if the locomotive struck the two hundred pounds of bone and muscle leaping ahead. As he reached the runningboard the deer turned off, tripped, turned a double somersault, and landed on its back in a pool in the muskeg.

Trainmen are not the only railroad employees who encounter moose. Sectionmen see them daily in summer, but it remains for the pump-men to come to more intimate terms with them.

Like Noise of Pump-Engine.

Percy Churchill, who runs the gasoline-pump that furnishes water for locomotives at Atikokan, has what he calls his pet cow. For several summers this cow has been in the habit of feeding in the open near the pumphouse. Every morning Churchill counts on seeing her not more than one hundred feet from his little building. Each spring she brings a new calf.

Samuel Boone, who runs the pump at Kawene, sees many moose in the little lake from which he pumps water for the railroad. And the peculiar thing about moose that feed near the pumphouses is that they will remain within a few yards so long as the big engine is banging away like a cannon. But so soon as the engine is stopped, they look around nervously and then hurry into the brush

Churchill and Boone have been watching the moose for years. They have never known one to remain near the pumphouse after the engine was shut down.

THE "SOO" HOLDS RECORD FOR CANALS.

MORE than 72,000,000 tons of freight passed through the Sault Ste Marie Canal during the season of 1912. Traffic through that waterway has doubled in two years, and still is increasing At the height of the season 124 vessels passed through the canal in twenty-four hours — a ship every twelve minutes, day and night.

The "Soo" carries more freight than all other ship canals of the world. Suez figures for 1912 are not available, but they will be well under 30,000,000 tons. Manchester and Kiel together may reach 12,000,000 or 15,000,000 tons. By comparison with these, other ship canals are negligible

Suez carries and Panama will carry more valuable freight than that which goes through the "Soo." But it is doubtful if any one now alive will see the two great ocean ditches carry as great a bulk of traffic as now moves from city to city through the humble fresh-water channel between our inland seas.—*Express Gazette.*

On First 303.

BY CHARLES W. TYLER.

The Fire-Boy Was Determined to Help Jud, But the Super Had His Own Official Opinion.

I HAD been on the Big M.'s spare board about four months when, after about eight hours in the hay, I was dragged out to fire first 303, a fast freight known as the "Cannon Ball." The Cannon Ball was a second-class train with a slam-bang schedule over the long end of the Hill division—a distance of one hundred and forty miles, every inch of which was heavy grades, curves, trestles, rocky cuts, and the "big hole."

I had finished one of those cross-country jobs with a leaky old hog, where the smoke gets all that's coming to him and a little bit more. We'd plugged No 4, the Chicago Flyer, stalled four times, and been set off for everything on the main line.

I'd baled coal and hooked till I was about ready for the shops myself, and we just got the old junk pile in time to prevent the sixteen-hour law fastening the can to us.

I was black as a crow, with a kink in every joint and a gnawing at my bread-basket that made me faint when I ambled into the oil-room and took a slant at the board. Then I got a jolt! When my hogger registered I'd be third out—and me with a hankering for about a week's vacation. I stood a slim chance of pulling down more'n about eight hours.

I didn't let any moss grow on my shoe-leather in beating it for a near-by beanery and filling the hole in my hunger factory. Then me for the wash-room and bunk-house. I couldn't waste time hoofing it half a mile to my haymow.

I was between the blankets and tuned up to do my share of the buzz saw act in no time. Say, can't a bunch of tired tallow-pots make a heap of noise sleeping sound?

It didn't seem as if I'd much more'n closed my lamps when I was brought to with several prods in the slats by the gink they call Jim, the guy with the book.

"Signs of life, smoke," he says. "It's you for first 303."

"Aw, tell 'em I'm sick," says I; and I wasn't kidding, either. I felt more like having a bonesetter look me over in regards to putting in a few new parts than I did like exercising a scoop on the Cannon Ball.

"But it wasn't any use to argue; they were too shy on fire-boys to let me get away with that much-used sick gag. So I signed up for No. 2630 and a hogger named Jud Hamilton.

Let me tell you right here, if you want to get a smoke artist when his ambition is at ebb tide, sign him up when the call-boy digs him out about one o'clock in the morning.

I got into my clothes, slid out for a feed at the hash-mill, got my stuff together, filled my water-jug, lit my torch, and beat it for the roundhouse, where I found the eagle eye oiling up

"Hello, tallow-pot," says he. "Hello, Jud," says I.

"Ever had 'er before?" he asks.

"Nope," I informs him.

"Pretty good motive power, steams free, but she's lost her arch and burns coal something scand'lous," says Jud.

"Looks like I'd have to juggle some

diamonds to-day, then," says I, giving the bell a dig for the table.

We backed out, went down to the plug, filled her tank, took coal, and died game till the shack showed up and headed us out into the yard, where we backed onto our drag. Then we coupled up, tried the air, and were ready for the high sign.

The car-grabber came up with the clearance and the information that we'd got ten hundred ton. Now ten hundred ton ain't such an awful load on an ordinary stretch of iron; but it was some drag for the fast freight on the Hill division. It meant that Jud would have to maul the everlasting stuffing out of that old goat to make his time.

"What d'ye thing this is, an extra?" says I, buttin' in and addressing my remarks to his nibs, the con, "Full Tonnage Jones," as he was known.

"You keep 'er hot, you wind-jammin' taller pot, and I'll look after the tonnage," he bawls back at me.

"Aw, gwan," says I. "If you had to fire the job you'd be going out of here with a hand-car and the hack."

Just then we got the target, Jud whistled 'er up, we got a high-ball from the rear shack, and my little bread-and-butter stunt had begun.

I didn't hang out aloft long, gazing at the moonlight. I just got right down on her old quarterdeck, grabbed the hook, and got at her. She didn't need much raking, though; every exhaust yanked her fire about a foot off her grates.

I slammed the hook up on the tank, grabbed the scoop, planted my hoof on the automatic door-pedal, and began putting the grit into her for all I was worth

I didn't go in for any artistic or scientific act, either. I just loaded that old scoop heaping full and planted it where I thought it would do the most good, and I put it there frequent, too; none of this three and four scoop stuff, then lean out of the gangway and gaze peaceful at the scenery, inhaling the nice, fresh breeze—not much

I just hung around where I'd be the most useful—that was about half-way between her diamond mine and the rat-hole.

I got her tail over her back and made my spinal column. I had pretty good luck, too. At the plug, half-way up our first hill, I had her howling; but it was hit the opening and reach the diamonds making some dent in the pit, and I figured that me or the pin-puller would have to be relaying some black diamonds into her bunker before we got through.

While we were taking water I noticed that the gink on my seat didn't show any signs of being useful, so I kicked down carbon dust till she got a full tank, then it was me at the rat-hole again

When we slid past Summit Siding I was taking a good long step for every scoopful, and my back was beginning to complain

For fifty miles we had a stretch of iron that had a shade on any roller coaster ever built. It had all the twists, turns, and dips that give you funny sensations.

Jud shouted over the information that unless a couple of her wheels came off we'd be likely to put a dent in the schedule before we reached Eastfield Junction.

A stray straw lid in a gale of wind has nothing on the way an old whale can bounce and lurch when she's being mauled along like a streak of greased lightning. And when the smoke has to get down and manipulate a No. 5 scoop between the coal-pile and her fire-door as she's sluing around some of those offsets in the main line at a fifty-mile-an-hour clip, it's likely to give him a hankering for a cozy spot on *terra firma* where he can ease off on trying to keep from being bounced around a slippery deck, with a chance of skyrocketing out into the scenery.

Two miles out of Valley Falls, Jud eased her off a bit, which gave me a chance to hit the seat-box after I'd prodded the misfit shack along and he had grudgingly given me as little as possible of the cushion. He was sore 'cause I'd had to disturb his sleep act.

I'll say right here that I found most of the shacks a mighty white bunch of boys; but as there are exceptions to most rules, so there is to shacks. This guy was one of them. He wouldn't have covered a seven to one bet that he was alive.

As we shot around Kennebunk Curve into Valley Falls we spotted a hot box about half-way back; but as we got a high-ball from the buggy about the same

time we took it that the con was going to let it go till we got to Rocky Hill four miles away—and set it off, as we had to stop there for water.

The order board and automatics all showed green, and we shot by the station at a good mile-a-minute clip. But right here was where the "Jinx Extra" side-swiped us

A ham brass pounder spotted the hot one, which was making some display in the dark, and yanks the target just as the hack comes humming along. The car-grabber sees it go red from the monitor, and right off gets visions of a ditched Cannon Ball, so he jumps down and pulls the air.

Then something let go. The second car from the engine snaps a knuckle and we shoots ahead before the brakes get busy. Then the rest of the outfit overtakes us. I got the benefit of the jolt as I was just climbing off the seat. The way I vibrated between the tender and boiler butt of that old whale was some sudden.

When things had kind of quieted, me, the hook, scoop, and about half a ton of coal were sort of scrambled amidships, and I had a lump on the back of my think tank.

The shack just unloaded—the window being open. As that was a sort of short cut, he took the short cut.

Jud just cussed, an' I didn't blame him.

Here we were—the first section of the Cannon Ball with the second section right on our heels, with two cars mussed up and on the ground, all on account of a measly hot box and a pin-headed would be O. R. T. man. It took us forty minutes to get generally overhauled and ready to wheel 'em again. We had to leave the cripples for the wrecker and set off the hot one. In the mean time our second section and the west-bound were tied up behind us

When we finally did get 'em rolling again Jud's one idea was to make up every minute we lost, an' he started right in, too.

The way he wheeled that outfit from Valley Falls to Eastfield Junction was something that the train crew won't forget while they're railroading on this planet, I'll bet.

The scand'lous way we pirouetted around those curves made first 303 a mighty poor place for a nervous man that morning. The head shack was scared stiff, him being some new to the game and fast freights not having been his line. He'd been used to speeding a bit behind Dobbin in the chaise down Aroostook way, but when it came to riding a noisy old junk heap around bends, with nothing but the rear trucks of the tender on the iron—why, he was some out of his element.

The flag told me later that the con got kind of uneasy, too, getting a sort of toe hold on the monitor box—the only piece of furniture in the hack that was stationary—and remarked that he was some thankful that there were thirty loads between him and the head of that animated procession of rickety rolling-stock

I didn't have much time to size up the speed situation and get nervous; I was having some difficulty getting plenty of Pennsylvania dirt into that old fire-box, owing to some uncertain equilibrium conditions. In spite of the slight downgrade, Jud was giving her steam for all she was worth

I just located the pedal, got my back braced against the edge of the cab, and shot it into her—that is, when I could comfortable. Then I had to go get back into the pit and scrape it down. You couldn't have pried that shack off the seat for a farm. The way Jud was lambasting 'em had corralled his Angora.

"Say, bo," says I, "how's chances for a bit of this combustible earth in the pit?"

"Nawthing doin'. You're paid for coal-heaving; I ain't," says he.

"Oh, very well, if that's the way yer feel," says I.

Right then I was having my hands full; but as we were over the hump and I knew Jud would be shutting her off pretty quick, I didn't get peeved if the fog did drop ten or fifteen pounds.

At the tower in Eastfield Junction we pulled up, cut off, and beat it over to the coal-shed. While we was waiting I filled her tank, then beat it across the tracks to the feed factory and got outside of a mug of Java, a wedge of pie, and a couple of sinkers, and hikes it back to the main, where the old 2630 was being coupled up and breathing hard to fill her train line with breeze

I shook her fire, dug out a couple of petrified hunks that was making dead spots, built it up a bit, got down, dumped her ash-pan, and was ready for the last eighty miles of our grind.

When the con came up with our orders and the clearance she was howling and had a black glass.

"Now, son," says Jud, "we're thirty late out of here an' we've got eighty miles of mighty undulating scenery to bat this old hunk of iron over. Just remember we're the speed merchants for the Cannon Ball to-night, and we're going to put her through on time."

"I'm with you," says I. "A white feather and a red stack—or bust."

The way the old 2630 picked her drag up and got out of town was a mighty pretty sight—pounding black smoke straight up into the air, her pop shooting steam and the white wings flying.

Jud started right in to make up more time. When we bucked the first hill, four miles out, her exhaust was like the roaring of Niagara and the way she was eating up the coal was a caution. I shut off the air and put it into her back corners till they were black, set the doors operating, and began putting the black on the white—and I couldn't get it there too fast.

It was fine as flour, that coal was, and a third of it would be out the stack before the scoop hit the door-ring unless I kept playing the wet-down hose on it mighty frequent.

The way I worked to keep that old tub hot is something I'll remember. If Jud hadn't been one of the whitest guys that ever pulled a throttle and we'd been an extra—I'd have let her go hang. We'd have just died frequent, blowed her hot and died till we got canned somewhere and had to take our eight hours' rest. But this was the crack fast-freight run of the road, and you had to get her through somehow, even if they didn't always give you a good steamer.

Before we got to the east end of the Big Hole her putty-gage sure indicated that she was sticking her tail between her legs. Jud gave me the gun every time I hooked her. We were losing water all the time, although I kept her wabbling around one ninety.

Eight miles from the Hole the black dust was getting back in the pit, the fog showed signs of settling, and Jud was giving her steam near the full length of the stroke, trying to put her back on her schedule.

The pin-puller had been having a little feed up on my rest roost; so, says I to myself, "Perhaps he feels like exercising a bit, so I'll kinder solicit him to kick me down a bit of the fog-producer."

"Say, ol' man," says I, going at him nice an' sociable on account of it being my second request, "would yer mind rustling me down a bit of coal? I'm getting hard put or I wouldn't ask yer to soil your dainty mits doin' such menial labor."

"Say, Willie," says he, "I told you once before I ain't getting paid for helping you. I'm getting my little two forty for braking the head end of this job. And, besides, I ain't feeling well, anyway; in fact, I think I feel worse," says he, with a grin.

"Why, you wall-eyed potato-digger, you might as well be worse as the way you are," says I, getting sore 'cause I'd wasted wind being polite to him. "Just as soon as I get a little more time, you squint-eyed hayseed, I'm going to bang you on the ear just to see if you are alive."

I was getting riled. After a tallow-pot about breaks his back trying to keep her hot, and, instead of responding, she lays down like she's tired, it's a goat-getting proposition.

At the east end we were twenty late; but as we'd got the outfit over the worst of it and had a slight pitch in our favor, we stood a good show of putting her in on time.

After the motor left us at the west end, Jud gave me a lift and shoveled over coal while we were taking water. With the fifteen-minute rest I'd got coming through I was some refreshed—and my grouch had some subsided when I spotted that hollow-chested, lantern-jawed pin-puller from Aroostook climbing aboard.

Now that guy had been sprawled all over my seat for the last eighty miles, sleeping most of the time. He didn't even have life enough to keep an eye out for signals and yell across when they showed up on his side.

An' here this hunk of imitation human being was coming back for more re-

pose on my cushion, when I could use it a good bit myself in the next sixty miles.

Right there my goat pulled his freight and flitted

"Say, you moss-growed relic," says I, "if you want to get pulverized, come up; otherwise get out and decorate or go back to the hack and meditate what a mad tallow pot would be likely to do to you! An' I'm mad!" says I. "I'm so mad my knuckles itch!"

What'd he do? Why, he showed good judgment by beating it for the buggy.

We were due out of there at 7 A.M. The running time was one hour and forty minutes. We'd have to make it in one-twenty, with a stop for water. The way we traveled after Jud got 'em going was some speedy even for the Cannon Ball.

At North River we made our last stop for water. I was on top and had the crane around when she came to a standstill.

"Half a tank'll hold us!" yells up Jud.

"All right, she's got it. Shoot!" says I.

Jud didn't waste any time whistling in the flag. He just gave the whistle a couple of short, sharp digs and then let her go.

"Guess we've left our flag!" I hollers over.

Those fellows generally did their flagging from the back piazza of the hack, leaving the rest to the automatics; but with our second section humping along behind us, this gink must have thought it better to be safe than sorry, for he got out and hiked

"Might as well left the rest of the gang for all the good they are," Jud informs me

I agreed with him, having in mind that guy from Aroostook.

From Houser to Harrisburg—the end of our run—was a stretch of iron known as "The Mountain" - with a mighty stiff drop, with strict speed restrictions of twenty-five minutes for the entire ten miles.

Passing Houser eight minutes late, Jud looks over and says: "Keep a mighty sharp eye out, son. We won't have any retainers this trip an' we're likely to drop down here some sudden if we do take a chance on decorating the carpet."

I covered my fire and hit the seat, leaning out the window, with my lamps open for signals showing up on my side around the curves. I didn't bat an eyelash going down that stretch of rocky cuts and sharp curves.

In places you could look across a ravine and pick up a signal nearly half a mile away. Again, we'd shoot around a curve, through a cut, an' go by the signal before we could call it.

After I'd picked up the home signal on Dead Man's Curve, just out of Harrisburg, and shouted across to Jud, "All green," we both took a long breath.

Going ten miles in twelve minutes ain't such a terrible speed, but dropping down "The Mountain" with ten hundred ton pushing you along and no retainers — why, you can't help hoping they'll all show up green.

When Jud pinched 'em down to a stop in front of the tower in the Harrisburg yard — on time — who should climb aboard, pulling out a ticker, but the "old man"—the division superintendent.

"Hamilton," he roars, "I'm going to give you thirty days to study up the meaning of speed restrictions on this division."

"Yes," says I, letting my tongue slip one over on my judgment in butting in like that, "and if we'd come in here late you'd have let out just as big a howl about hoggers who couldn't keep an ice-wagon on a schedule. Why don't you give a man credit for navigating your speed special over these streaks of rusty iron and putting the Cannon Ball through on time?"

After that hot-air blast I would have taken a plugged nickel for my rights on the Big M.

The old man glared at me for nearly a minute.

"Boy," says he, "your intentions may be O. K., but your valves need packing."

"Hamilton," he snaps at Jud, "I'm going to let you off this time, but no more speeding down the mountain - it's bad business. I'd ought to fire that fresh tallow-pot of yours, though."

"Gee," says I, "I pretty near ran my signal that trip!"

WHEN IS AN AGENT POPULAR?

The Boss of the Rural Terminal May Keep His Human Kindness Working at a High Pressure, but There Are Always Petty Grouches Who Throw the Derail on the Golden Rule Special.

BY F. B. LOVETT.

"I GUESS our new agent will make good in this town, all right," said the night yardmaster. "If the local sentiment continues to grow in his favor, this burg will cease to be a competitive point, because we'll be getting all the business and the J. O. trains won't have to stop here for anything but water. That goes to prove what I've always contended: That the Golden Rule brings quicker results than in any other line of business.

"Take, for instance, last Sunday's excursion to Watsonville. The widow Jenkins purchased two half-fare tickets for her little girls at six-bits apiece, which about emptied her purse. The youngsters, in the exuberance of their youthful spirits and in anticipation of the day's frolic, did some pretty tall romping around the depot while waiting for the train and lost their tickets.

"Now that was about the biggest kind of a catastrophe that ever happened to those kids. The widow couldn't afford to buy any more tickets, the kids set up a despairing howl, and everybody began to hunt for the missing pasteboards, without result.

"What does Bilkins do? He gets busy with the Golden Rule. Stepping up to the ticket-window, he calls to the widow, 'Madam, allow me to replace those tickets your children have lost.'

"There's no false pride about the widow. She'd washed and scrubbed those kids and curled their hair and boxed their ears a dozen times in order to get them lined up for that picnic, and she wasn't a bit finicky about accepting duplicate tickets. In fact, she was mighty glad to get 'em.

"It cost Bilkins a dollar-fifty; but he earned that widow's undying gratitude and attracted the favorable attention of every one around the depot. You can't deny that a play of that kind is bound to bring quick results."

"Quick results won't do, Joe," replied the third-trick man. "Instant results is the expression, because that's what happened. Old Bill Hawkins, the only and original 'dead loss' of the village, was an eye-witness to this practical application of the Golden Rule, and as it was the first time he had ever seen it working around these parts, he decided to try a sample of it himself.

"He's got two of the worst kids that ever made life miserable for everybody they come in contact with. They were enthusiastically anxious to attend the picnic and take advantage of the broad field for deviltry which it offered.

"The old man's credit died a natural death in every store in town about two years ago, and his wife has been taking in washing ever since to keep the family from starving to death.

"A two-bit piece and Bill wouldn't recognize each other without a formal introduction, it's been so long since they've met; but when it comes to getting something for nothing Bill is there with the nimble brain.

"Dragging those brats of his across the street to the corner saloon, he calls Bilkins up on the phone.

"'Mr. Hawkins,' he says, 'get that—

Mr. William Hawkins—I'm sending my two boys on that Watsonville excursion Give them a couple of tickets when they get there and I'll be down later on and pay for 'em.'

"'Sure,' replied Bilkins. 'Send 'em along.'

"The kids came over and got the tickets, and, of course, told everybody on the train how their clever dad had worked that agent for a free ride.

"Not to be outdone in cleverness, an estimable lady of the village, with a brood of three, admitted that all of her tribe were riding for one fare, owing to the fact that she had found two tickets on the station platform.

"Not knowing to whom they belonged until after the widow Jenkins had been presented with duplicates, she held her peace. 'I might just as well be that much ahead of the railroad company as anybody else,' she declared.

"The widow Jenkins, not hearing of the final disposition of her original purchase and feeling that her dignity might have suffered somewhat by the acceptance of the charitable presentation of the duplicates, let it be known widely that the agent had short-changed her for the two half-fares on the first deal and delivered only her own ticket.

"Not being used to traveling and rather confused by the crowd during the whole transaction, she further stated that she had fallen an easy prey to his skilful trickery, and but for the timely discovery and subsequent howl of the children, grave complications might have arisen which would have ended in a heavy suit for damages and the final elimination of Bilkins as a railroad agent.

His Intentions Were Good

"'Them fellers that are oily all over like he is 'll bear watching," she assured her sympathetic listeners. 'He's got long, thin fingers, like a gambler,' she added darkly, and if she'd said he had been an escaped convict it would not have created any more consternation among her hearers. So much for the widow's 'undying gratitude.'

"That ain't all the quick action Bilkins got for his money, either. Bill Hawkins, being in a facetious frame of mind after his clever coup, the first one he had pulled off in a long time, visited around town and started the report that the railroad company was giving a free excursion to the children.

"In proof he offered the statement that his own youngsters had attended, because everybody who knew Bill could readily understand that anything his family got in on must be free.

"Now there are about a hundred soreheads around town, with kids at home, who are denouncing Bilkins because he didn't give the 'free excursion' more notoriety so they could all have attended.

"Did I hear you admit, Joe, that you didn't do the situation justice when you said 'quick results'?"

"Well," grudgingly admitted the N. Y. M., "if what you say is true, the deal didn't pan out very well for Bilkins, but complications like that are liable to arise. His intentions were all to the good."

Biggs Was Some Efficient

"Cut out that platitude gag," said Third Trick, "and get down to railroading. The Golden Rule, like every other rule, must work both ways or it don't work at all

"If you'll show me where it's even got a fighting chance in a depot I'll preach it as long as I'm able to whisper; but there's nothing to it. Casting your bread upon the waters is a comparatively sure way of getting your money back compared with trying to treat your fellow man as you would be treated if you're an agent. You wouldn't break even once in a hundred years."

"I'm bettin' on Bilkins to show a bigger balance in the freight-book and on the ticket report than Biggs ever did," replied the N. Y. M.

"I'm not so sure about that, either," replied Third Trick. "My private opinion is that the figures are liable to dwindle instead of stretch out. Biggs was a savage, all right; but he was on the job from all its different angles all the time.

"When one of our patrons wanted to know anything about freight rates or classifications he came down here, yelled his question at Biggs, and kept on going. He got the answer hot off the griddle and didn't need to stop.

"If a business deal went wrong with any of our leading merchants and they

wanted a goat to unload their feelings on, they came down here and stirred Biggs up and always got a good run for their money.

"Every morning when Biggs came to work he would look over the express and freight way-bills *once*, and he could remember who all that junk was for the balance of the day.

Found Errors with Marvelous Magic

"He could stick that long beak of his into a ticket report that some of his assistants had balled up and nose out the errors so quickly that it looked to me like each error rose up in front of him and said: 'Here, Biggs, fix me; I'm wrong.' Some agent, Biggs."

"He won't have anything on Bilkins when it comes to juggling figures," said the N. Y. M. "Bilkins is right out of the auditor's office."

"Again I'm obliged to remind you that your head-piece was chiseled out of solid marble and that, instead of being round, like the ordinary human knob, it's square, and the ideas that emanate therefrom are qssified," said Third Trick. "Let me tell you something about that auditor's office. It's a gum-shoe outfit all the way through. Everybody walks on their toes and speaks in whispers. A man in that department dives into a maze of figures at 8 A.M., and don't hear or remember anything more until the whistle blows at noon. If he's hot on the trail of a balance he don't even hear the whistle and misses his lunch.

"You see more boots around here with railroad spikes in the heels than gum-shoes, and whisperin' would be considered very bad form in the neighborhood of an agent who was adding up a column of figures two feet long.

Went on Soda-Pop Sprees.

"'There are three telephones doing a continuous performance from seven in the morning until twelve, midnight, and the trainmen's window furnishes its own share of diversion, all of which has shattered the nerves of the man from the auditor's office to such an extent that, while it is only ten days since he was checked in, he is already a week behind in his work.

"The warehouse is full of freight and express which nobody knows anything about, and Bilkins is going around town drinkin' soda pop and dreamin' that he's gettin' the business and striving for popularity as a railroad agent, which proposition is certainly a tough game, because I've never yet met an agent in my travels who could make good on a claim to popularity."

"It don't seem reasonable that they would all be in bad," protested the N. Y. M.

"Well, come to think of it, I did overlook a bet when I made that statement.

"One winter I dropped off at Texarkana and hit the P. G. for a job. I was assigned to the night trick at a place which I shall call Williamsburg, Texas. It was a very small town and the citizens averaged up to the usual stick-whittling brigade.

"I stepped into the depot to announce my arrival to the agent and found a ponderous man who weighed two hundred and eighty pounds. There had been a dozen boomers there previous to my assignment, each of whom had worked from about one night to a week and left for greener fields and pastures new.

Threw Geniality Into a Ditch.

"The agent's greeting was not cordial. It was evident that he had tagged me as another traveler who was playing very short engagements. He directed me to the hotel. That evening, while eating supper, I ventured a remark, feeling that I was on pretty safe ground:

"'I always thought fat people were good-natured and jolly, but our agent here seems to be an exception to the rule,' I remarked.

"Imagine my surprise when a unanimous chorus of protests greeted that remark.

"I rambled over to the depot about thirty minutes ahead of time, in order to let the agent go to an early supper and, at the same time, show him that I was a pretty good scout myself.

"He took no notice of my early arrival, however, but sat glumly working on his books until seven o'clock. Promptly at that hour he arose, sparingly counted out some change, and, with a gruff 'good night,' departed.

"'Looks to me as if boomer operators are barred out of the agent's circle of cordiality,' I soliloquized; 'but maybe he'll thaw out later on. He must be a pretty good plug or these scissor-bills wouldn't all be boosting for him.'

"I never was very strong for village cut-ups, but I thought it rather strange that not a single one of them showed up at the depot during the long evening. Almost a week passed without any cordiality getting mixed up in my association with the agent.

"I noticed that none of the villagers hung around the depot during the day and those who had business there were served with an expeditious curtness which didn't even give 'em a chance.

"The agent's popularity never waned for a moment, however. He was the one and only shining light in the community, the Sacred Ox of Williamsburg, though there wasn't half a dozen people in town he'd take the trouble to speak to, and unless he made the 'hello' talk first there wasn't any one who'd take a chance on speakin' to him.

Mystery of the "Fine Feller."

"They still kept passing me that 'fine feller' noise until I concluded that there was a great big joke in the deal somewhere, and I decided to investigate.

"One night shortly after I had taken this resolution the local freight arrived on my trick. After unloading his junk the conductor found that he had got through just in time to land a thirty-minute stab. While he was sitting around the office waiting for the time to pass I sprung my mystery on him.

"'Say, Parsons,' I said, 'what's the secret of Lordman's popularity around these parts? Everybody's boosting him as the finest feller that ever happened, but I haven't seen him smile or heard him speak a pleasant word since I've been on the job. The way he rawhides these jaspers when they show up at the depot is somethin' fierce.'

"'That's easy,' replied Parsons. 'He tamed this whole bunch of shorthorns the first Sunday he was in town, three years ago, and they've stood hitched ever since.'

"'You know,' he continued, 'there's lots of booze shipped in here by express, particularly on Friday night. It used to come on Saturday night before Lordman's time. Now I don't suppose there's been a Sunday since the road was built that all the gay-cats of this coming metropolis haven't indulged in one grand revel.

"'The dry Sunday I speak of was the first one after Lordman had been checked in. The agent he relieved was pretty strong for John Barleycorn, and usually put in the Sabbath delivering and sampling the wet goods at the depot. That was what he was canned for. Lordman is a teetotaler and a believer in the Sunday Rest Law.

Wouldn't Deliver the Booze.

"'He made the early morning passenger on the day I'm going to tell you about, got excused by the despatcher until the evening train, locked the depot, and after breakfast deposited that portly carcass of his in a rocking-chair, and proceeded to enjoy his morning cigar.

"'About this time the booze consignees began to arrive at the depot, and, after waiting impatiently for about an hour for the agent to show up and distribute the joy-water, they called on him in a body at the hotel.

"'It rather disturbed their collective goat to find him on the veranda idly smoking, when, according to their notion, he should have been on the thirst-relieving job long before. He was invited in no very amiable manner to get busy.

"'You can imagine the frame of mind he threw the dry boys into when he informed them that there wouldn't be any express delivered on Sunday at his station in future—the future commencing right away.

The Best He Can Get.

"'They bucked and roared and finally started to call him names. This was the signal for trouble. Lordman, before he took on so much flesh, had a rather nifty athletic record. When he got through cleaning up some half dozen were taking the count and the balance were in their cyclone-cellars, wondering what was going to happen next.

"'Some time later a package of ex-

press was stolen from one of the trucks on the station platform. Lordman posted a notice in the waiting-room stating that any one found loitering on the company's property, day or night, without a good excuse would get all that was coming to him. That is why this is the lonesomest night job on the division

"'They don't even dare visit with the night man since Lordman issued his proclamation. There's no one around here who wants to start him on the warpath. He carries a gun, too, and three hundred pounds of rough house agility, a six-shooter, and a railroad are a pretty good combination to let alone. They boost for him because they're afraid to knock.'

"And," concluded the Third Tricker, "he was the only popular agent I ever knew."

"That wasn't genuine popularity, though," objected the N. Y. M.

"No, Steve," agreed the Third Tricker; "but it was about as near to it as any hard-working, much-abused station agent will ever get. His destiny is to be one of the goats of the universe. He's the fall guy for exorbitant freight rates, missing and bad-order express packages, lost trunks, delayed trains, and washouts.

"When anything goes wrong on the railroad the public takes a strangle-hold on the agent and hangs on until matters are straightened out. In addition to these inconvenient trifles, he's got to buck the standing army of natural-born enemies of the railroad. They make him the unhappy medium of their malice.

"Here's Kimball, whose wife runs the hotel across the way while he takes things easy. When the line was being laid out through this neighborhood, twenty years ago, Kimball was camping out here in a two-by-four shack on a desert claim that wouldn't raise a jaybird's breakfast in a hundred years.

"The company paid him twenty-five hundred dollars for a right-of-way through his cactus farm, built a depot right in the middle of it, and made him a rich man. And that old yap has been hollerin' 'Robbers!' ever since. He was the man who started the petition which resulted in Biggs's removal, because Biggs chased him out of the depot when he came to cuss out the railroad.

"This town and most others are liberally garrisoned by the standing army of railroad knockers. They're sore because the company won't Dh their freight. The railroad is rich, therefore it should be benevolent, and they think they're the logical objects of its munificence.

"If by any sleight-of-hand dealing they can skin the company out of even a fishplate, for which they have no earthly use, they feel that they have pulled off a meritorious stunt. Naturally, the agent is the recipient of most of their knocks and the object of their machinations. You would find them enthusiastic advocates of the Golden Rule, to be practised by the railroads *only*," wound up the third trick man, with sarcastic emphasis on the word only.

"Well, Bilkins has got a motto hung up in his room which reads something like this: 'Don't kick even a yellow dog; he might have a chance to bite you some day.'

"Kick Him Good and Hard!"

"There's no reason why the practise of that kind of a system shouldn't make some friends even for a railroad agent."

"Can't say that I agree with you even there," replied Third Trick. "I never saw any one get much 'over that deprecating and conciliatory route. I'd rather take Biggs's version of that motto, which I imagine would sound like this:

"'When you kick a yellow dog, kick him good and hard. He'll never come close enough again to bite you.'"

"You're the limit," said the N. Y. M as he grabbed his lamp and hurried into the yard.

When you tackle a new job, be careful how you take the cross-over. It's safest not to go too fast.

WHAT SAVED ME FROM THE ROAD.

Appalled by Much Work at Low Wages, the Discontented Wanderer Found Freedom and Happiness in the Wild Woods of the North.

BY O. U. T.

THE hobo, it is said, is a product of an economic condition. An undisputable fact, no doubt, but as long as the remedy for the evil is not recognized, there will be no change. Life is a long period of agony for those who have to endure an unfavorable and disgusting environment. No wonder that many of these men gladly accept the first access to freedom that comes their way, generally "the road."

Now and then a man who has been in the same throes of discontentment as they are, does no harm in telling them how, when on the brink of becoming a "gay cat," he had turned his thoughts toward a better goal that gave him his freedom and made for him an earthly Elysium.

For several years I was a railroad man. My work promoted me five times, and, had it not been for an unexpected physical defect brought about by too much study, my youthful aspirations to become a railroad official might have materialized.

Eventually I had to forsake my position. I did so reluctantly. I went West, camped, fished, and hunted along the coast of Puget Sound and the interior of Alaska. In my peregrinations, penury sometimes drove me to beg my bread and to live a good deal a hobo.

Finally came a day when my defect disappeared. So I broke camp and gladly and hopefully went back to the city. I secured a position, and immediately started to work, but, having had much freedom, I was suddenly appalled by so much labor to be performed for so small a remuneration

"Get out of that jail and go back to Nature's bosom," it told me. What was I to do? For some time I debated as to what would be my best move. To work in confinement was too sickening to consider it

At last, in the eleventh hour, an inspiration saved me from joining the rodeos. I returned East, and after a while married and bought myself a small piece of land on the edge of a virginal wilderness. On this we built a comfortable log-cabin

That was a year ago. Since that time the superficial and artificial things of which I was once a slave have entirely vanished from my mind. I now live, work, and sleep according to my ideals. I am justified to add, parenthetically, that never before have I been so happy and contented though I am impecunious.

Perhaps my gratification emanates out of the fact that I work for no one save my family, and no one outside of my family works for me. I have a wife and baby to feed and clothe. I have a cat, hunting-dog and sled-dog. In winter the sled-dog hauls wood, water, and sometimes myself.

My cabin stands out prominently among the trees on a little knoll on the rim of a big lake. Series of mountains enclose the lake. In the lake are many species of small and large fish. In the mountains are many species of birds and wild animals. Hunting is good

Directly back of the cabin there is a small garden, which yields all our vegetables. What exultation it is to take care of one's own garden. What pleasure when seeds which you have planted begin to sprout from the earth.

In summer I fish and swim. Sometimes I go fishing with city folk and am paid for my pleasure! In autumn and winter I trap fur animals and hunt. At my leisure I cut and saw wood for the following winter. Aside from the money received for pelts, what I earn by fishing enables me to save something for the unexpected.

My bills for groceries deplete my purse but little. As for meat, coal, rent, ice, *et cetera*, there are no bills. I secure all that we need. They abound about our home, and I help myself.

We find our home cozy, attractive, and very inviting. Can it be other than a blessing thing to have a home, no matter how humble, but so long as it satisfies our ideals.

So think of freedom and a modest home of your own ere taking to the road.

In the Glare of the Headlight.

BY A. HERSCHIN.

How the Bo Won His Bet that He Would Make the Journey from Port Costa to Oakland Mole.

HILE they were at the yard limit Conductor Coakley dropped down to the lower rear step of the last car of the swaying train. With his lantern held high, he leaned far out and closely scanned the ground ahead. Up in the cab, and facing him, a second lantern poised aloft revealed another trainman similarly engaged. On the off side two more lamps, suspended by men at like points in the same absorbed scrutiny, betokened an unusual cause for vigilance.

In one of the cars an interested passenger, amid the protests of his fellow travelers, raised a window on each side to join the train crew in their silent contemplation.

The conductor tightened his cap against the night wind. "If he *is* aboard and tries to get off now, he's a goner sure," he muttered grimly.

But the expected figure did not appear; not even when the train came to a stop at the station, where Conductor Coakley called out to his companion in the opposite stairway:

"All right, Tom! Go meet Gus and you and him round the head end together."

With that both men were quickly on the ground. Immediately there began a rapid but expert inspection of the brake-beams, steps, doorways — every convenient or secluded nook that a hobo might select for beating a train.

From coach to coach the search progressed, but always with the same fruitless result. If a hobo were their guest it was very evident he had long since disappeared. At length the conductor reached the station and stood waiting for the brakey on that side, who had been investigating from the cab down to their meeting-place.

"Well, what's doing?" demanded Coakley.

The shack grinned confidently.

"We've ditched him for good this time; that's a cinch," he answered. "I even shot up to the pilot and he wasn't there—or on the blind, either."

Still the conductor was not satisfied. Always thorough in a thing of his own starting, he ordered: "Better make sure, Ralph. Skin aloft and rubber around there a bit. Make a job of it; this bum's as slick as grease, you know."

The shack obeyed. Meanwhile, the off-side men approached the pilot, rounded it, and continued hurriedly to their waiting chief. Theirs was also an optimistic report. They were absolutely convinced that the intruder had been driven out. The lone passenger who had concerned himself in the man-hunt remained with his head poked out the window and gave an intent ear to the discussion

Imagine the amazement of the trainmen as they turned toward the general office and saw at the edge of a crowd their Nemesis grinning in triumph!

The men stood—paralyzed. Before they could recover their senses the bo announced with cool impudence:

"Well, say, you ginks are dead easy, you are. No trouble at all to give you the slip!" Then to the man in the car-window: "Pal, it looks like you'll lose

your ten-spot, after all. No welshing, mind!"

That was all. In a flash he had bolted through the open door of the waiting-room to the other side and was lost in the solid black background of the night.

No sound of his footsteps came to the alert railroaders, so they waited no more. Suddenly they remembered that the man had effected the same noiseless getaway by means of the rubber-soled shoes he wore, first at Dunsmuir and again at Red Bluff.

At Dunsmuir, in the early mountain darkness, after the conductor had seen his undesirable passenger put off for the first time, he adjured him sternly to remain off or suffer certain unpleasant consequences. This applied also to the other half-dozen rodeos who had also been receiving gratuitous transportation on the brake-beams and blinds. They obeyed the admonition implicitly; they were caught dead to rights and lacked the nerve or the wit to venture further.

Not so the chap of the rubber soles. This undersized, middle-aged personification of "nerve" coolly informed the conductor that he had ridden underneath all the way from Ashland and proposed to continue beating it right through into Oakland "on that very train -see?

"An' who's clever enough to stop me, huh?" he added

Then, to clinch this astounding defiance, he drew forth a package of tobacco, spread apart its contents, and, extracting a five-dollar piece, held it before the conductor's eyes.

"See that?" he taunted. "Well, I'll bet you even money I do what I say. That means I go all the way to Oakland with you, see? Are you game to cover it?"

The conductor refused in unmistakable language.

But standing near by, an interested auditor, was a tall, heavy-set man attired in corduroys, top-boots, and wide-brimmed sombrero. In the band of his sombrero was the little red hat-check that meant a through passage.

He was Mattson, a home-bound mining engineer, with a healthy sense of humor and rather pronounced sporting proclivities. In grinning appreciation of the tramp's temerity he stepped forward.

"I'll take you up, Jack," he offered. "You got me interested. But lemme do better than even money. I'll make it two to one. If you do land safe there's ten bucks to help on a new set of rags. Get me?"

"You're on, pal!" said the hobo. "And have that kale handy when we roll in, for I'll sure be there to collect. Now watch my smoke, Mr. Con."

Thus it began. So far the advantage was all with the tramp. Assuredly it seemed as if he would make good his boast to successfully evade the pursuit of the train crew and appear, as pledged, at the Sixteenth Street Station.

As the wager had been made in his presence, the conductor was bound to observe the company's rigid rules relative to tramps. However, he welcomed the opportunity to resist this particular bum. His professional pride was aroused and he was implacably determined to match his wits against those of the bo; but to his credit be it said that Conductor Coakley did not underestimate the resourcefulness of his opponent.

It was his doubtful claim to glory that he had beaten every railroad in the country at least once in his life, and now, old age coming, he was ready to retire, but in the way he had begun—by beating it.

Small wonder, then, that Coakley deemed it a notable victory were he able to dislodge this chap. He scorned the road detectives in the contest

Of course, Coakley required the assistance of his subordinates. That was legitimate enough, but other than that—no! He had a strong man's faith in his own ability and that of his men, which accounted for the espionage established against the tramp.

So it was with astonishment that he admitted himself outwitted when the audacious little scrub smilingly awaited him at Red Bluff, the Shasta Limited's first stop after Dunsmuir. This emotion quickly changed to wrath as he reflected that all his cunning and painstaking effort to dispose of the pest had failed.

Purposely had Coakley and his assistants remained on the lookout long after they had left the station behind. If the tramp had come aboard, thought Coakley, he must have done so on the run; but under those circumstances he would certainly have been detected

No, the fellow had not been seen. The crew had even gone around the engine, but without avail. The tramp was not in sight as the train lay in wait, nor was he visible when the cars were in motion. Yet, despite all this, he had ridden with them.

How? Where? What was the answer?

The conductor and shacks alike scratched their heads in bewilderment, but resolutely proposed to maintain their vigil. The man who had wagered two to one enjoyed it immensely. He was getting a run for his money.

Benicia was reached. At this point the trains are broken in two and conveyed across the Carquinez Straits to Port Costa by the great ferry freighter. It was at Benicia that the last scene of the strange drama was enacted, and the trainmen boarded the ferry to convene in a special session of the council of war.

At Port Costa the train was again made up. Once more it set on the main line cleared for action in the final lap of its seven hundred and seventy odd miles run from Portland to Oakland

As it stood there like a great panting amphibian cast up by the waters of the straits, Conductor Coakley personally investigated the front end with a lantern. Through the zone of the glaring headlight he passed to the off side of the cab.

He retraced his steps with bowed head into the engine's fanlike spread of illumination and came back along the station side of his charge—and not until the last bright light of Whisky Row had perished to a speck did he and his companions withdraw to the comfortable interior of the limited.

No sign of a tramp—of a man dashing out at top speed to catch the train on the fly—was observed. Surely, if their tenacious foe was aboard, he must have come by airship. So thought the conductor with a grin of contentment, as he sank into a rear seat in the smoker.

Then on through the night dashed the crack flier, making relentless war against time. On, on, it drew smoothly, weaving gently from side to side over the fine, level road-bed. The glittering string seemed overjoyed at the prospect of a long surcease from labor in its haven of rest at the Oakland Mole. On it tore with never a stop, gathering speed. On past the sugar refinery at Crockett, past the dingy yellow depot of Vallejo Junction. Like a flash it burst past Rodeo, Pinole, Sobrante; past the great powder works at Giant; past San Pablo, Richmond, where poured in from San Francisco Bay the sharp, invigorating tang of salt.

On, on, on—and swiftly swung to the rear Stege and West Berkeley, and amid screaming whistle, hot oil, and screeching brakes, the great coast ranger burst triumphantly into Sixteenth Street Station, Oakland.

And, as before, long ere the yard limit had been reached the conductor and his crew had posted themselves in their accustomed positions and peered keenly ahead for some trace of the elusive stiff. In a way they regarded this last espial as perfunctory, for they felt that he would not—could not—appear.

By continuing their observations, however, they merely desired to obtain direct, positive proof that their combined wits and energy were infinitely superior to those of a braggart bum. It would teach him a lesson, they chuckled. Supremely confident they were that he had been left behind at Port Costa, where the search had not yielded even the slightest evidence of his whereabouts.

Out of a window, with a hand shading his eyes, poked the shaggy head of the big mining engineer. Of a sudden he shouted, pointing toward the darkness just beyond the station:

"Good land alive, look! There he is!"

The little hobo came slowly into the area of light, calmly loosening the low-hanging dirty handkerchief about his neck which had served as a dust-guard for his nose and mouth.

Quietly he stopped and awaited the advancing trainmen and the mining engineer, without the slightest fear of bodily assault, if, indeed, such were intended.

The shacks, on the run, reached him first Their remarks disclosed the possibilities of the English language as a medium of emotional relief. To another this wild outburst would have been

annihilating, but not to this particular hobo. Calmly he weathered the vituperative gale as he took the two shining five-dollar pieces from Mattson.

"Much obliged, pardner," he chattered, pocketing the coins. "Tough riding where I was. It was worth every cent. Gee! it was awful crimpy when we hit the bay, but I just had to stick. We were going six ways for Sunday."

"Well," said Mattson, "you're certainly a game duck, whoever you are, and you won on the square. What gets me, though, is how you managed to do it. Put us next, won't you? It smells like a mystery."

Here the conductor spoke up sharply.

"Now, then, since you've got your stake, suppose you explain yourself. How did you do it? Show me and no harm will come to you," said Coakley.

"All right, Mr. Con. Come along with your lamp."

The entire group moved out of the lighted station into the dense darkness which immediately precedes the break of dawn and walked to the black bulk of the engine, with its long projection of dazzling white light. All blinked and lowered their heads.

"Now let me go ahead for a second," said the bo. "When I sing out, you come and find me."

In an instant he stepped to the head end and disappeared.

"Come ahead!" he called distinctly from a near by point.

The five men obeyed and crossed the track into the fierce effulgence of the engine's eye.

It blinded them. They blinked hard, jerked down their hats, and once more their heads drooped. Single file they marched along. The conductor, the last one over, suspecting a trick, thrust his hand through the ribs of the pilot, but felt nothing

Mystified, they cleared the rails and were just about to go further, when up from ahead came the summons:

"Come on back, gentlemen! Here I am, on top of the pilot!"

Ludicrously simple. There, drawn into the smallest possible compass, was the meager form of the hobo, perched on the pilot high up under the gleaming metal on the engine's front.

"See how it is now," he explained, jumping down. "I only had to beat you running to get here. That was easy enough on rubber soles—and I'm still there on my pins. I had to laugh seeing all you guys come along gapping for me; but you couldn't see me on account of my black rags and your peepers on the blink from your own lamps and the blinding glare of the headlight.

"And take it from me, Mr. Con, I ain't the only guy that's rode on the nose-end, either, though I admit it's pretty risky to a nervous gink on a cold night. Lots of queer things us boes has to do to slip one over on you fellers, but, believe me, I wouldn't tackle this ride in the mountain country at any time, but down in the valley this time o' the year it ain't such rotten traveling when your back's to the wind and you're making love to the boiler-head. It was a cinch!

"I'm hungry now, so it's me for a hash bazaar to feed my face."

MADE A POOR GUESS THAT TIME.

A MUCH bothered conductor on an eastbound car was asked by a chilly lady passenger to close the ventilators. As he had already been importuned to open them by a half-dozen other patrons, he resorted to diplomacy.

"Madam," he said, in a confidential tone, "I'd gladly close the ventilators, but unfortunately a health officer is aboard the car, and he insists that they must be left open. I'd make myself liable to a lot of trouble if I opposed him"

"A health officer?" asked the lady.

"Yes, ma'am," replied the conductor. And then, intoxicated by the success of his scheme, he unhappily added, "That's the man three seats ahead—the one with the brown derby."

The lady looked.

"The one with the brown derby?" she repeated. "Yes'm; they say he's quite an expert on germs and things. I believe he is a German gentleman."

The lady stared at the conductor. "He's nothing of the kind," she snapped. "The man with the brown derby is my husband!"—*Railway and Locomotive Engineering.*

HOW THE ROAD-BED IS BUILT.

Though Modern Machinery and Powerful Explosives Expedite the Work, Right-of-Way Constructors Still Employ Many Old Methods in the Conquest of Mountain, Plain, and Chasm.

BY WINTHROP ELLIOTT.

TRAVELERS seldom consider the road-bed over which their train speeds, yet its construction is one of man's most remarkable achievements. Making a railway's bed is always a grim fight with nature, but the courage and skill of engineers have created the smoothest of steel pathways in the face of the most tremendous difficulties.

The first railway construction engineers had little experience, save such as had been gained in building wagon roads. These pioneers grappled with their problems and solved them with the same audacity as the men of to-day. Modern machinery and high-powered explosives have more than doubled the speed with which a road bed can be built, but the construction of every railway presents some new phase of the problems that puzzled the bedmakers nearly a hundred years ago.

When Stephenson was building what is now the London and Northwestern Railway he came face to face with an apparently insurmountable obstacle. It was a great area of swamp and bog, the largest in the British Isles. The railroad's path lay straight across it. How was a solid, permanent bed to be laid across such a quaking foundation? Stephenson pondered this question for a long time. Day by day the track crept nearer and nearer the brink of the morass. He recalled the principle on which highways had been built by the Romans across similar stretches of land. The Romans ran their roads along lines as straight as a ruler's edge. Nothing turned them aside except mountains.

Stephenson took a leaf out of the book of the old Roman road-builders and applied it on a huge scale to the problem that confronted him. First he laid a bed of tree branches, broad, thick, and closely interwoven, across the treacherous bog. On these he built what is now called a corduroy road of tree trunks. On this he piled his rock and gravel. The underpinning of wood sank out of sight, but Stephenson had so carefully calculated the burden it would have to bear that in the end he had as solid a road-bed across the marsh as any part of the line.

The First Mattress.

This was the first "mattress" ever used in railway bed making. Stephenson's example has been followed by construction engineers ever since when they have had to cope with similar conditions

The custom now is to make the foundation of the mattress of a great mass of tree-trunks. The first layer of these is many times wider than the track These giant logs are bound together and upon them are laid, gridiron fashion, layer after layer of other logs, the pile narrowing upward. On the top is placed a thick layer of small branches thatched together

On this rest the layers of rock and gravel that form the embankment. It makes a bed as solid and permanent as a way hewn out of a mountainside

That long stretch of the Florida East

Coast Railway that runs southward from Miami through the Everglades is unique among the road-beds made on marshes. The level of the Everglades is lower than that of the sea which beats against the narrow barrier of rock fringing the coast. It is the worst swampland in the United States. On the edge of the tropics, it is a forbidding place, inhabited only by birds and reptiles, a fever-haunted jungle.

In the beginning it was seen that it would be impossible to drain the portion of the Everglades through which the railway must pass. It was possible, though impracticable on account of the cost, to fill in the embankment with an enormous quantity of rock. The engineer-in-chief, the late J. O. Meredith, who died in the harness while the railway was being built, conceived a most audacious idea.

Built a Line Across Sea.

He had two great dredges constructed and towed to the point where the worst of the marsh began. They were placed at opposite points about 100 feet apart. They began to tear up the soggy soil and vegetation and piling it between them. As they advanced, each dug a canal and raised up a barrier of dry land between. The soil that was heaped was so water-soaked that it did not dry very quickly. Four more dredges were built, and they followed the leaders, piling layer after layer of earth on the embankment. Covering the top with crushed rock and making it a finely ballasted road-bed was comparatively simple after that.

The other remarkable feature of this extraordinary railway, the section constructed across the sea from one of the Florida Keys to the other, ending at Key West, has been described so often that it should be familiar to almost every one. There are some details of the construction, however, that are not so well known. The first seventy-eight miles of road-bed running out to sea from the mainland contain fourteen miles of bridges and sixty-four miles of embankments across the islands and the shallow straits.

The viaducts are mostly of reenforced concrete—practically one solid mass of masonry. To build their foundations, cofferdams had to be constructed and the water pumped out. The bed of the sea had to be dried so that the bridge above might be joined forever to the coral rock below. Where the water was deepest—in the channels between the keys where deep-draft ships might pass—caissons were sunk, and the men worked at the bottom of the sea, under compressed air, while building what might be called the "legs" of the railroad.

Work like this would not have been possible in Stephenson's day, fourscore years ago. Pickax and shovel are still important factors in making the railway's bed, but they are being supplanted by complex machines that do the work of many hands. The steam-shovel picks up a wagon-load of earth or rock with every swing of its mighty arm. The "dragline" excavator, with its endless chain of shovel-like buckets, scoops up and carries away more earth than an army of teams and scrapers.

Hydraulic "giants," with their powerful streams of water, wash away mountainsides. Great blasts of high explosives bring giant cliffs tumbling down. A host of other modern devices, undreamed of by the railway builders of old, accomplish hitherto impossible tasks.

Washing Away a Mountain.

The hydraulic giant had been used by placer miners in California and elsewhere for a long time before it became an adjunct of the road-bed makers. Its construction and operation are simple. Water is brought down by a pipe from a considerable height. The pipe ends in a nozzle from three to five inches in diameter mounted on a frame so that it can be swung about and raised or lowered. The force of the stream, if the fall of the water is great, is tremendous. It has been known to cut a man's body in two a hundred feet from the nozzle.

One of the first places where the giant was used in railway construction was in building the Northern Pacific through the mountains, where great chasms and ravines separated one huge barrier from the next. Bridging or filling in the ordinary way meant incalculable expense. The engineers were puzzled. Then, so the story goes, one

of the construction foremen, who had been a placer miner in former days, suggested using a giant. He was ridiculed at first, but the more the engineers thought of the matter, the more they were inclined to try his plan.

There was a stream that ran down the mountainside high above the cañon. This was dammed with tree-trunks and rocks and the water was diverted through sluices and pipes to the giants. When all was ready the water was released. The terrific force of the streams tore into the earth and rock.

The mass piled higher and higher along the line that had been laid out for the huge fill. The embankment, when it was finished, was nearly 250 feet high and twice as long. It was as solid as if it had been built toilsomely by dumping car-load after car-load of earth and rock from above.

Men Drowned in Tunnels.

Water, however, is one of the greatest enemies that the builders have to fight. In the Austrian Tyrol the construction engineers encountered a river that was subject to floods at certain seasons of the year. They tried to harness it, but they could not hold it within bounds. They took a different tack to conquer the unruly stream. It was a big undertaking, but absolutely necessary. They changed its course and it threatens the railway no longer.

The taming of rivers is part of their work, but now and then they encounter one that cannot be subdued. One of the first railroads in China, a line running out of Shanghai, crosses a mile-wide valley through which flows a narrow stream. In the wet season this stream becomes a mighty flood, but the waters rise and fall with astonishing quickness. Generally the flood is over in four or five hours.

It was found that the first high embankment that was built across the valley offered too much resistance to the river. It was all but swept away. Thereupon the engineers dropped the tracks some ten or fifteen feet, so that the level of the rails was only a foot or so above the smooth floor of the valley. They rock-ballasted the track for 50 feet on either side and planted bushes along the edges to break the force of the water. In this way the railroad bed did not obstruct the floods. Since then the river rises and falls as it always has, but it does not damage the road-bed. Trains are held up for a time, but proceed as soon as the waters recede.

Used Kite Over Niagara.

When it comes to putting the railroad's bed on stilts or swinging it over an abyss the construction engineers are no less resourceful. On the Cape to Cairo Railroad, in Africa, below Victoria Falls, a chasm had to be bridged. It was about twice the width of the span of the gorge below Niagara Falls. To get from one side of the river to the other it was necessary for the men to make a ten-mile détour.

The same methods of establishing the first link were followed here as were pursued when the first suspension bridge at Niagara was begun. At Niagara a kite carried the first string across, but here a rocket, with a slender cord attached to it, was shot over the thousand-foot abyss. Then a thicker cord was attached to the string and hauled across, then a small rope, then a wire cable, and so on. From this small beginning the bridge grew, a cantilever with a single span of 500 feet.

A problem of a different sort had to be solved when the Denver and Rio Grande reached the Royal Gorge, near Cañon City, Colorado. Its solution was the unique "hanging bridge," which is one of the wonders of the railway world. The cañon here is only 30 feet wide. Through it the river rushes with incredible force. The cliffs rise almost vertically some 3,000 feet on either side. There was not enough money available to tunnel, as was first suggested by A. A. Robinson, the chief engineer.

Lowered Men by Ropes.

Finally he resolved to swing a bridge lengthwise along the stream, hanging it from girders fastened above in the opposite walls of rock. It was done, but it was as dangerous bridge-building as ever was attempted. The men had to be lowered by ropes to cut away the rock. This was some thirty years ago, and the

first hanging bridge has since been replaced by a larger and heavier structure to meet the needs of traffic

For railways in the clouds the Western hemisphere leads the world. In the Rockies and the Andes, where the railway's bed is tilted at an angle to make the grade, the engineers have done some marvelous things. The Oroya line runs from Callao, Peru, 138 miles, and climbs 15,865 feet in 107 miles. It is better known as the "Meiggs Road," after the name of the daring Philadelphian who built it some forty years ago. At one point, where the road has been crawling along the side of the precipitous mountains, it stops abruptly.

There is a ledge up above that it climbs. It does it by means of a "V-switch" There is a turntable at the end of the lower level. The train is taken to the top of the V and left there while the engine runs down one side of the angle and is swung around until it faces the other arm of the V. It is coupled to the rear of the train that it has been pulling. Then it pushes the cars up the next zigzag.

This sort of a switch is cheaper than a loop and takes less room. There are twenty-two of these V's on the Meiggs Road. At the end of each there is an embankment to catch the train if it breaks away. It did so once, and although the rolling-stock was damaged, the passengers were not hurt.

Sand Ties Up Road.

Spirals and loops are more common than V's, but are almost as picturesque. There is a fearsome corkscrew in the railway's bed on the line to Mecca. On the Leopoldina Railway, in Brazil, there are several combinations of the V and the spiral in order to climb the mountains. The Denver and Rio Grande's "Georgetown Loop," near Georgetown, Colorado, is another of these sinuous beds that are famous among railway builders and sightseers. There are other remarkable spirals in the Cascade Mountains, on the Great Northern, which give sightseers plenty of thrills, but not near as many as they gave the builders.

Shifting sands are another difficulty that the track-builders had to face. Up in the Andes, on the Meiggs Road, the wind piles the sand in cones ten to twenty feet high along the track, but so loosely that the locomotive is able to plow through them like heaps of snow. Sand is less bothersome on the desert sections of the line of the Cape to Cairo Railway and on the road to Mecca than it is in the Andes, several thousand feet above the sea.

When the road bed has to be cut through frozen earth an entirely new set of obstacles must be overcome. In the region traversed by the Transsiberian Railroad, in the region of Lake Baikal, the winters are terribly severe. The earth is eternally frozen, and never thaws more than a foot below the surface. In the forests twenty inches is the usual depth at which frost is encountered even in the middle of the warmest season.

Blasting Through Frozen Earth.

The problem was almost as great as building a railroad through solid rock. Practically every foot of the way had to be blasted out with dynamite. In Alaska the builders of the railroad over White Pass and beyond found conditions even worse, for the variations of temperature were greater. But quaking tundra and icebound earth were conquered and a solid bed for the rails was made at last.

Snow, in the far North, is another element that has had to be taken into account very carefully. In the Scandinavian peninsula, above 68 degrees north latitude, are many miles of railway where the snow-plows work all summer. The snow is dry and light, and the winds heap it into dense drifts in the cuts. Miles and miles of "snow screens" lay along these lines to catch and heap up the snow before the gales drive it onto the right-of-way. Because of the snow the engineers have tunneled at almost every opportunity, regardless of first cost; for tunnels are always free from snow.

A railroad does not advertise its tunnels as attractions, but to many engineers they are far more interesting than extensive views from towering mountain tops. The tunnels on the White Pass and Yukon Railroad offered unusual difficulties, because in such wild

regions the problem of transmitting power to the rock-drills is one of the big things to be solved.

Forced to Abandon Machines.

In some places the air compressors must be set up some distance from the drills. At one point on this Alaskan railroad the pipe from the compressor plant had to be carried across a gorge over a temporary suspension bridge 130 feet long.

In building the famous St. Gotthard tunnel in the Alps the great difficulty was with subterranean streams. Time and again the drills or the dynamite tapped these underground rivers. Many men were drowned. So dangerous was the cutting of the rock in some places that the men abandoned the machines and cut their way forward by hand. From 4,000 to 7,000 men were employed continually on this undertaking, and before it was completed 1,177 were killed or injured.

Building the road-bed is often a race against time. This was especially the case in the construction of the first transcontinental railroad. The Central Pacific started eastward from Sacramento and the Union Pacific westward from Omaha some twoscore years ago. To each road the Federal government promised certain subsidies in land and bonds for every mile. How far each company would be allowed to build depended on its own exertions. According to the rules of the race, each should build until the two tracks met.

Swept Away by Avalanches.

It was the greatest railroad race that the world ever has known. A vast fortune depended on the outcome. Not a moment could be wasted. Engineers and men worked in relays every hour of the twenty-four. They did not wait, on either side, for a completed road, but sent men far in advance, sometimes forty miles, while those behind would build over the gap. Wagon roads were cut through forests or over mountains.

Even in the bitterest weather the work went on. Enormous bonfires kept the men warm and thawed the ground. The sullen roar of avalanches was heard frequently. Sometimes the slides swept them like flies from the steep slopes where they labored. For two years this frantic race continued. Ogden, Utah, was the objective. The Union Pacific won, with the Central only fifty-three miles away. Later the Central Pacific bought the fifty-three miles of track after the government had arbitrated the matter; so eventually both roads reached the same goal.

Now and then a bridge or a section of a road has to be finished within a certain time. A Western road, not long ago, offered a premium of $25,000 for a bridge built within a certain time. The contractors offered a portion of this to the men if they put the job through in time. They worked day and night, and the last rivet was driven home with a resounding cheer a few minutes before the limit expired.

It took just as incessant fighting to push the long, sinuous bed of the railway across the deserts of Arabia. The Hedjaz Railroad — from Damascus, the most ancient living city in the world, to Mecca and Medina, the holy cities of the Mohammedans—though little more than half as long as the first transcontinental route in America, claimed a greater toll of human life in its building.

This road runs for a thousand miles through as barren and forbidding a country as ever was touched by pick and shovel. There are scorching deserts where the sand blows like snow; gaunt mountain ranges that had to be torn apart or tunneled, and dreadful chasms to be bridged. Deadlier than the blazing sun or the consuming thirst or the ordinary accidents of the struggle against nature were the marauding Bedouins, who fought the construction men tooth and nail all the way.

More than once the fierce tribesmen swooped down on a construction-camp and left no living thing when they departed. Time and again, on the other hand, the Sultan's troops fought the tribesmen. Raids, skirmishes, and pitched battles followed one another as the road-bed stretched farther across the sands. The engineers and soldiers conquered in the end, and to-day the pilgrims to the shrine of the prophet roll comfortably over one of the best road beds in Asia.

Honk and Horace.

BY EMMET F. HARTE.

Our Old Friends Look for a Chance to Do Some Charitable Work—and Get It!

"MY idea is this," declaimed Honk in his nobody-but-a-fool-would-differ-with-me manner, "there should be radical restrictions imposed upon the horde of commonplace people who marry indiscriminately and fill this beautiful land of ours with generation after generation of wretched, half-starved, illiterate incompetents. What chance"—he bellowed—"what chance in this world has one of a dozen or more children whose parents have an earning capacity of a dollar and two bits a day at most? Such a brat is handicapped from the start. I maintain that laws should be enacted and rigidly enforced to regulate—"

"How about Benjamin Franklin?" I interposed. "He was one of seventeen—"

"The world of our day is altogether different," Honk retorted. "Conditions, opportunities, methods, standards of living, have changed. Problems Ben Franklin never dreamed of confront us. Humanity trembles on the brink of mental, moral, and physical retrogression. We are face to face with the most profound crisis in the history of the race. I'd suggest that you secure from the public library a book or two on eugenics, Horace. It might help you to cast at least a quasi-intelligent vote."

I knew whither the discussion was tending—universal suffrage—so I bethought me of an errand up-town and flitted forth like a busy bee. Why should I get in a stew about the retrogression of the race, anyway? Let 'em retrogress, if they enjoy it.

As for the rest of it—putting marriage under the civil service, maintaining a strict censorship of progeny, the chloroform route for aged and infirm persons, *et cetera*, all these things concern me but negligibly. I've more pressing troubles of my own. Besides, when one goes yapping and snapping at the car of human destiny as it rolls on its ponderous way, they usually get steam-rollered for their pains.

After a proper interval I returned to the station—entering the east door and traversing the general waiting room on the way to our sanctum saleratus. In passing through I noticed a family gathering congregated in one corner. The center of attraction seemed to be a weary-looking woman with a tow-headed, moist-faced infant on her hip, about to dispense some sort of comestibles from a sack in her starboard hand.

The importuning youngsters of toddler size tugged at her skirts, and three other small specimens of tousled humanity, ranging up to a flapperish girl of, maybe, twelve years of age, hovered near. My prim subconsciousness made a memo of the fact that floor and settees were in imminent jeopardy of being messed over with bread-crumbs and grease, but I only frowned, and passed on. Even the riff-raff have to eat some time or other, I suppose.

Honk was engaged in an interchange of hot shot with somebody, over the telephone; at any rate, he was mincing

All back numbers containing Honk and Horace stories for sale at this office.

no mincemeat in his palaver. I don't think the man lives that Honk is afraid of—over a telephone. He hung up with a farewell bang as I entered.

"That was Parkinson-Crowley talking," he said, noting my look of inquiry. "Wants me to circulate a subscription-paper for money to build a Home for Waifs."

"And you refused?" I ventured.

"Not at all. I agreed to push the movement; I likewise expressed my views on the subject quite freely. I'm in favor of bringing up ninety per cent of all children in scientifically managed institutions. Not over ten out of every hundred children are given anything like proper training. What's-his-name differed with me on that point, but I opine that I gave him something to ponder over."

"No doubt you did," said I. "Your conversation sounded like "

A yowling and screeching resounded in the waiting-room just then. Honk reconnoitered from the ticket-window.

"Humph," he sniffed. "It's just those brats fighting again."

"I noticed 'em as I came in," I said. "Who are they?"

"Search me," he growled. "They got off the local this forenoon. They've been in there ever since. There was a lout of a man with 'em a while, but I see he's faded away. Two—four—six—he must've taken a couple of the kids with him; I counted eight in all at first. Ouch! That brown-headed one is some scrapper."

I took a look. No less than four of the smaller kids were mixed in a noisy, hand-to-hand conflict—the bone of contention being an apple tightly clutched in the grimy paw of the said brown-headed one, battling valiantly to defend his prize with hoof, tooth, and nail.

Little brother in the gingham rompers went down from a kick in the stomach and sister of the pug nose retired temporarily, nursing a clawed lip. Shrill screams reverberated when somebody stepped on somebody else's face in the fourth round.

"My Heavens, children!" chided the maternal parent of the brawlers. "Children! Alfred, leave go of Ruby's hair! Blondina, take the baby while I look for me a stick."

This terrible threat gave the belligerents pause. Hostilities were nominally suspended to ascertain if a stick was forthcoming. Brown-head took advantage of this golden opportunity to gobble the apple. Quiet reigned for possibly five minutes. Honk scratched a ruminative ear, bursting presently into discourse.

"There's your apt illustration of the case in point," he remarked. "A flock of kids brought haphazard into the world, to grow in a hit or miss fashion, as best they may, to manhood and womanhood, without order, plan, system, or method. With scant training, undisciplined, helter-skelter, to ultimately become irresponsible and unfit to cope with life except in the most half-hearted, hopeless fashion. You notice also the mother—a woman with an anemic soul, haggard, careworn, prematurely old—and the father, pinched, bent, dull-eyed, the spring gone from his step, and poverty, like an old man of the sea, clinging with a strangle hold about his neck.

"How much better it would be to place these youngsters in a well-ordered institution, there to be educated and molded by scientific methods into useful citizens, leaving the mother free to renew her lost youth among pleasanter surroundings—"

"But there's papa, too," said I. "What about poor papa?"

"*Pff!*" Honk snapped his fingers. "Such a man is of small consequence. Let him make good in some line of useful endeavor, if he can. If not, feed him a dog-button. The common honey-bee has an excellent method of dealing with drones. We might do well to—"

The thud of a falling body sounded in the waiting-room. This was immediately followed by squeals and infantile war-whoops. The fighting had been resumed. With brief respites in between, there were a number of similar onsets as the afternoon wore on.

Honk and I busied ourselves as best we could at our routine duties, letting the disputants yelp and scratch it out unmolested. But after so long a time Honk grew peevish. An undercurrent of whines and wails began to be noticeable, the burden of which ran:

"Mommie, gimme somepun to eat! Mommie, I want my supper!"

"Jumping Jupiter!" expleted Honk. "Those brats are getting on my nerves. They'll have to cut that racket out, that's all."

He proceeded to flare out on the disturbers in person. I rubbered pleasantly from the wicket.

"My dear madam," Honk began, much in the way he would begin a business letter, "ah—ahem! Your family seems to be pretty restless. I rather think they're in need of sustenance. Food, ma'am—something to stay their hunger. The growing child is like any other young animal: his system demands a deal of nourishment. I'd suggest, ma'am, that you employ some such measures in the present instance."

The woman looked properly puzzled and abashed. Six smaller pairs of eyes regarded Honk in unblinking awe. Their mother impressed the enormity of their offense upon them.

"Now, see," she said, "didn't I tell you the man'd come an' git you if y'kept on?"

"These children are hungry," insisted Honk. "They need food—something to eat. I say, you'd better give them something to eat, ma'am!"

"Oh," the woman said with dawning comprehension. "Why—I ain't got nothin' to give 'em. They've et all we fetched with us, an' I've not got no money to buy more until my husband comes."

"You're waiting for somebody to meet you—your folks, perhaps?" palavered Honk.

"No. We come here to locate. My husband he's gone out to look around a little to see if he can find work. We 'lowed we'd sit here till he comes back."

"Pa ain't got no money neither," piped up a small voice at this point.

"Ah," breathed Honk weakly, "indeed!"

And with that he made a hurried retreat whence he had come, leaving the financially embarrassed family to their fate.

I indulged myself to a modest snicker. "Back already?" I said. "What's the matter? Haven't struck a snag, have you?"

My compatriot seemed a bit stumped; he gazed at me blankly without answering.

"Oho!" said I. "Your fine theories won't work, eh? This is a case that requires horse-sense. Go somewhere and lie down: I'll attend to this case"—and I seized a pencil and note-pad and sauntered out confidently.

As an initial move, to demonstrate my peaceable intentions, I patted the littlest sister on the coco and chucked baby brother under the inferior maxillary.

"Lady," I said glibly, "I understand that you are short of funds, and that your husband is hunting work. I will ask you a few questions, if you please." The woman moistened her lips and composed her facial expression for the inquiry.

"I'll ask you to state your husband's name, his occupation, and former place of residence," I continued

"Why, we come here from Millardsville," deposed the witness, beginning wrong end first and back-firing. "My man works at whatever he can git to do. His name is Judson Bidewell." I noted down these important facts.

"I assume that you have come to live in Valhalla permanently," said I; "so, of course, you must have shipped your household goods and other personal belongings to this place. Is this correct?"

"We brought a few things in a box," the witness testified. "One feather bed and some dishes. The rest of our stuff we had to sell to git the money for our railroad tickets. They made us pay for all the children except four—".

Um! I thought. Mankind may eke out a precarious existence by barter and trade, but it takes cash to buy railroad tickets.

"How many children have you, Mrs. Bidewell?" I next asked.

"Eight livin'." (Odd's bods! I judged from that that there were others defunct.)

"Have you relatives or friends here?" I queried.

"No, sir. We come from back in Ohio."

Sundry of the smaller youngsters were beginning to squirm. I pocketed my notes.

"All right, m'm," I said. "I thank you kindly. We'll see what's to be done in this case right away."

Thence departing by the outer door, I stepped briskly across tracks to the

medicine house, where I donned cook-apron, switched on a couple of burners in our electric cooker, and got busy. Some shakes subsequently I reappeared before the Bidewells, bearing certain fried-egg sandwiches, cheese, pickles, and cold roast beef.

When in doubt, I've always found it a good bet to lead trumps. At least one thing resulted: I qualified as the Right Honorable Sir Goodman Bountiful, on the spot; my status, as duly accorded by the smaller scions of the House of Bidewell, was something like Santa Claus in the rôle of commander-in-chief of the Salvation Army.

All formalities being suspended, the bunch fell to with a will. I ducked into the office, leaving behind me the rhythmic smack and crunch of busy jaws. With some surprise I learned that Honk was visibly absent. He appeared to have gone somewhere; but pretty soon I heard his mellow voice cadences floating from the waiting-room.

Through my lookout hole I saw him. He was distributing from a big paper poke oranges, bananas, figs, dates—a whole line of tropical fruits—among the Bidewells. It looked as if Mrs. B. and her brood had indeed been caught in a manna-shower without an umbrella.

Chortles of childish glee resounded. Honk's fame threatened to overshadow mine. Moved by the general enthusiasm, he unbent and "booed" at the baby, tickling him, or her, as the case might be, in the ribs with a banana, to that youngster's open-faced delectation.

There entered upon this pleasant domestic scene a lean, pink-mustached, nondescript man wearing an imitation panama fedora and the most cheerful of smiles, accompanied by two boys—small-sized replicas of himself in look and bearing. Ribald shouts of recognition and welcome rose

"Daddy! Daddy!" they shrilled, mingled with infantile crowings and squealings, and the swoop and patter of hurrying feet. 'Twas plain to be seen that, whatever his shortcomings might otherwise be, this Judson Bidewell galoot was a prime hero and pal to his numerous progeny.

They swarmed up his legs, swung by his coat-tails, besieged, assaulted, and captured him by storm.

"Well, well," he grinned. "Here's all o' pappy's pets a r'arin' an' t'arin' My! Look at Oliver. What's he got? Or'nges! Sakes an' sorrows! An' Rose Mary a eatin' aigs 'n' meat like a' old settler! Who's goin' to give pappy a bite, huh? Don't all speak at once—"

Any number of soiled fists vied with each other for the inexpressible boon of giving pappy a bite. Meanwhile, the two auxiliaries lost no time edging in on the trenchering. One boy deftly relieved the girl called Blondina of a hunk of beef and an orange, while the other annexed the sack Honk held and harvested an egg sandwich from little Ruby in a single gesture.

But there was plenty for all, so these little discrepancies were quickly adjusted. Everybody munched, and, munching, waxed genial.

"Did y' find anything that looked like steady work?" queried wife of husband.

"Well, no," said he, favoring Honk with a neighborly smile and helping himself to a handful of dates. "but I like the looks of this here town, fust rate. It 'pears t'be a' up-to-date place—th' right sort of place for a man to raise his fambly in," he added, sitting down, gathering up a couple or three kids, and proceeding to dejacket a banana. "I 'low I'll git plenty of work in a day or so, mebbe," he concluded optimistically.

Honk tiptoed from the fellow's presence, awestricken, and without a word.

Our new acquaintances made themselves comfortably at home while we sneaked out to bolster up our ebbing vitalities with a little sustenance.

"One thing," observed Honk tentatively, "your friends the Slidewells don't allow any of the ordinary little discouragements of life to upset their equanimity. They believe in letting the other fellow do the worrying, all right."

"Bidewell is the name," said I, "and the allegation as regards friendship is somewhat far fetched. But as to their stewing and fretting, I agree with you. None of 'em seems bothered, to speak of. It's a nice way to be," I added. "I admire the trait in any one. It's the only true philosophy."

"Humph!" he sniffed, seizing his hat and hitting the concrete for his beloved club.

Toward the "noon of night," while I

slept peacefully in my bunk, a commotion woke me. It proved to be Honk—thrashing around in closets and lockers.

"Where the—who the—what's become of all our bedding?" he railed. "My mattress is gone, and I can't find a pillow in the car—"

I feigned extreme drowsiness; but the clamor grew in volume. Honk presently laid hands on me

"Where's my bedding?" he bellowed. "Wake up, you! Where's my—"

"Oh, shucks,' I said half-apologetically, "I loaned a lot of pillows and things to those people in the station. You know they're spending the night there. Must've got your mattress by mistake."

"What!" he ki-yied. "You let those vagrants take my bedding? Why, I didn't dream but what you'd fire 'em out of there before dark! I—I—"

"You're full of microbes!" I said "Contain yourself. What would you? D'you think I'm going to let a frail woman and a lot of helpless children sleep on the bare floor? No. You may be utterly heartless, but I'm not! I'm no loud-mouthed sociologist or babbler about eugenics, but I'm there with the helping hand when needed, see?

"Bidewell himself was very patient and uncomplaining. He told me not to bother about getting him anything to sleep on. I felt downright sorry for him, so I fixed him up a bed same as the rest. Now, avaunt!" I said. "Muffle your exhaust. Get quiet. Sleep on the sofa—or wherever you like—but get quiet!"

It isn't often I'm obliged to bruise Honk's tender feelings thus harshly. I hate to do it, but sometimes we're constrained to chasten those whom most we cherish. And well, he swelled up like a snake-bite, but ceased his bickering. I turned over and slept soundly. I forgot to say that I'd retained a pillow and mattress for my own use

At breakfast Honk was still foaming in the gage.

"I suppose you are aware that these ragamuffins can't take up their permanent residence in the station, Horace," he said. "It's against the rules."

"Sure," I acquiesced. "But no doubt they'll get their affairs arranged to-day. When Bidewell finds a job they'll be all squeegee."

I hadn't intended becoming a regular provider of provender for the stranded family. Supper, lodging, and breakfast was the extent of my projected benefactions. I even tapered off a bit on the breakfast; it consisted modestly of coffee in tin cups, and sinkers for ten. I entertained no hankering whatever to become advertised as a feeder of floaters. Prestige of that sort has too many far-reaching possibilities.

The waiting-room was a scene of riotous domesticity. The kids were having great sport gamboling over the benches and pulling off amateur acrobatic stunts on the heap of bedding in the center.

Bidewell's pater and mater were seated at ease watching the antics of their hoodlum brood with parental pride and admiration. I set down my coffee-pot and basket and, mid more or less of disorderly scuffling and crowding, distributed tin cups and doughnuts, and poured libations to sweet charity. Some of the smaller fry expressed audible dissatisfaction regarding the absence of bread, butter, pie, bananas, oranges, and other delicacies, but the older members cast no outward aspersions on the breakfast.

I joined Honk in our office. We went about our daily tasks. The nine ten train arrived and departed. But Judson Bidewell lingered—basking contentedly in the sunshine of an east window, with his youngest babe on his knee.

Five diminutive Bidewells capered up and down the platform, hung in the office windows, or played "robber" in and out of the freight-room. The cares of life weighed lightly on the whole bunch of them, truly. And doubtless they depended on Fairy Godfather to come through at the proper time with a plentiful and well-cooked dinner. Well—

At nine-forty-five I thought I'd drop a sly hint to Jud old easybody, any way.

"Got a job yet, sport?" I inquired, pausing in passing his place of rest.

"Well, no," he confessed cheerfully. "I been a nussin' this here buster 'bout all mornin'. Ain't he a tooter of a boy, though? He jest won't let his pappy go to hunt no job a-tall."

"Uh-ah!" I murmured—and moseyed on. Bidewell procrastinated for another hour.

The flock went on with their frolicsome pastimes. In fact, they took the

place. Honk presently grew restive. And then he began to evolve plans and specifications.

"Wonder if your happy-go-lucky friend couldn't get on the corps of city street-cleaners?" he mused. "I think I'll take him up and introduce him, anyhow."

"He's no friend of mine," I said hotly. "He's a lazy loafer. I repudiate him."

Honk, by dint of diplomatic persuasion, got our easy-going incubus up on his pins and marched him off townward. They were gone some hours, trailing back about noon — Honk chipper, but Bidewell looking somewhat tuckered.

"Visited the city hall," rehashed Honk, "and found nothing doing. Then the wagon-works; nothing doing. The brickyards and cement-mill; nothing doing. The wholesale houses, the abattoir, the ice-plant; nothing doing. The tanneries—"

"And nothing doing," I finished for him. "Looks like we've got 'em on our hands, whether or no, don't it?"

"This afternoon we'll try the hominy-mill, the garages, and retail stores," resumed Honk hopefully. "The guy seems willing to work, only he lacks initiative. If he don't connect with something pretty soon, of course, I'll merely have him pinched for vagrancy and we'll turn the rest of the outfit over to the Associated Charities." He sniffed suspiciously. "The station seems to be getting an odor," he said, frowning

"What have you planned as regards their dinner?" I ventured.

"Let 'em fast," he replied. "They had supper and breakfast, didnt they? What more do they want? Continually stuffing the stomach enervates a person, anyhow."

I noticed, however, that Honk himself accepted the risk mentioned without hesitation, stowing away the usual amount of food, at the usual time and place, with his usual enthusiasm. 'Tis a nervy physician that takes his own medicine.

War and pestilence broke out as soon as hunger began to gnaw at the vitals of the numerous little Bidewells. Yelps, screeches, and whines floated heavenward. The chorus was deafening. Work was simply out of the question. I stood it for one wild, fantastic hour, and then, growling in my epiglottis, I beat it for the Medicine House for a basket of sandwiches. It was either that or a padded cell for mine. Even then the noisy little wretches were only quiet for half an hour or so. My goat—

But Honk breezed in toward sundown. The Bidewells, father and two sons, accompanied him. I was in no mood for bootless or long-drawn palavar.

"Job?" I asked briefly when Honk and I were alone.

"Nup," he replied. "That's what I wanted to see you about. Nobody seems to want the fellow at all. I think his careless and irresponsible appearance is against him. I've figured out the only possible solution for our difficulty, though."

"Very good," I indorsed. "Let's have it."

"I'll make a personal appeal at once to the Board of Associated Charities. These brats will be placed in homes for adoption. The woman can, no doubt, secure employment in domestic service at good wages. The man, at my request, will be given a term in the workhouse, with a stay of execution if he hikes for out within a stated time. I'll run uptown now and attend to the whole business before supper."

In my disgruntled state of mind the proposed solution seemed to me both feasible and convenient. I made no demur. Honk departed.

Five minutes afterward Butch Poteet hove to in his one-horse wagonette. He pulled up before the row of bill boards across the way and got down with a bucket of paste and other impedimenta to stick up a flamboyant poster advertising the merits of "Hairine for that Hirsute Hiatus." Butch is the general manager of the Valhalla Bill-Posting and Advertising Bureau since March 1 last.

The two biggest Bidewell boys promptly posted over to rubber. I noticed them hurrying back after an interval. Then Bidewell senior ambled over with them and all engaged in an earnest confab with Butch. After which the Bidewells bustled back once more. I displayed myself in the window inquiringly.

"Well, we've landed jobs," grinned the leader of the trio. "Go t' work tomorrow. Two dollars a day for me, bill-

postin', an' a dollar apiece for th' boys, passin' circulars."

I unbent. Fortune, after all, had been merely dillydallying with us. "Hurrah for our side!" I cheered. "The thing to do now is to get settled. Rent a house, move in, and get under your own vine-yard and fig orchard. Come"—I hurried outside—"I know where there's a mansion to let."

The house was in Buttercup Row on Daffodil Alley. It had four rooms and a hydrant. The rent was ten dollars a month. I stood sponsor for the ten.

On the way back to the station Bidewell said he didn't know what to say hardly. They had no furniture, no money, no nothing; besides, the station was comfortable—

"There's a lot of unclaimed household truck in the freight-room," said I mercilessly, "and I'll fix it so you can run your face at the corner grocery."

By sheer force of bulldozery I ruthlessly forced the loading of furniture, stove, box, and all the kids onto the van of Hippo Jones, who chanced to pass opportunely. The van receded in the distance with the Bidewells aboard. I breathed freer.

And then I got out my broom, mop, bucket, soap, washing powder, and hooked on my hose. It was time to clean up after the guests. Honk, with a burly blue-coat in tow, came presently.

"Too late," I said. "I got your protégé Bidewell a position. He begins his work to-morrow with the Valhalla Bill-Posting Company. I also obtained places for his two sons with the same firm. I then rented a residence for the family, fitted them out with furniture, and stocked their larder with eatables. They are now comfortably established in their new home. Eugenics while you wait," I couldn't help adding.

A silence sweet as song descended o'er the vicinity.

Judson Bidewell we saw usually of evenings, when he came over to loaf at the station. He was an expert loafer. And often he regaled us with the doings of Rupert, the baby, and the wit and wisdom of Oliver and Rose Mary.

One night there alighted from the west bound local a large, red-nosed man with a pale-gray eye, who said his name was Paulson, that he was sheriff of Fillmore County, and in quest of one Judson Bidewell.

Bidewell cowered behind Honk, who acted as spokesman.

"What's the charge?" he demanded.

"It's like this," explained the sheriff, without emotion. "This Jud Bidewell party had a habit of leaning against things. So he sidled up against a lamp-post in front of Scrivener's hardware store in Millardsville, a few days ago, and said post fell over and smashed a fifty-dollar plate-glass window. Then Jud he skidooes, forgetting to settle. About six months or so rest in jail ought to square it, as, of course, he ain't any money—"

"Jail?" said Honk. "What about the man's family? He's got a wife and a dozen or two small children."

"I'm not authorized to take his family," returned Sheriff Paulson, "I s'pose the charity people'll see after them. They'd likely be better off—"

"*Ptt!*" Honk interrupted, producing his big leather bill-book. "I've an idea Bidewell could obtain damages against your tin-horn town on account of that lamp-post falling, but no matter. He is a good citizen; he is taking care of his large and intelligent family. I am glad to assist him in this his hour of need. I will pay you fifty dollars in cash, which will cover the cost of a new window and absolve our friend here from blame."

"Why," said the sheriff affably, "sure thing. That's perfectly agreeable to me, and I don't see why it wouldn't be with Scrivener. I'll give you a receipt."

Honk counted out five ten-dollar notes. Everybody seemed satisfied.

Honk strode into the office, whistling a sprightly air. I followed with down-dropped jaw, for I was just the least bit twisted in my psychology. Sometimes I can't quite fathom the—but Honk sat down at a desk and, still whistling, disinterred and unfolded a large paper.

It was the subscription list he'd been circulating in behalf of the projected Home for Waifs. I watched him run his finger down the line. When he stopped I saw his own name written boldly, with "$50" set opposite.

This figure he carefully erased, setting in its stead the sum of 50 cents. Then he calmly refolded the paper.

"There, that's better," he said.

Observations of a Country Station-Agent.

BY J. E. SMITH.

No. 65. — Why the Freight Shipper Is No Longer a Lamb and the Freight Solicitor Has Ceased Being Classed as a Brigand.

BETWEEN the traveling freight solicitor and the traveling passenger solicitor there is this difference: The freight man deals with established firms and experts connected therewith, who know the transportation game as well as he does. His business each trip is largely made up of interviews and exchanges with the same men throughout his territory. He learns to know them personally. In return, they learn to know him and his line with similar familiarity.

The traveling passenger representative is not expending his time and talents on established customers, but is daily calling on new people, who are usually uninformed about railroad transportation.

Freight shippers of consequence to command the attention of the traveling freight solicitor are settled institutions, while every one travels or expects to travel. The freight man's dealings are with well-founded and well-informed organizations, while the passenger man must go out among the rabble, seeing a banker here, a labor delegate there, a teacher, a doctor, or a farmer. He has a wide field for tact and versatility, and, to my mind, has more desirable work than the freight man. In many cases, however, both duties are confined to one representative.

The freight solicitor, proceeding with his duties, comes into a town, takes a car or walks out to a manufacturing plant, while the traveling passenger man will get a stepper at a livery-barn and drive ten miles out into Liberty Township to see a prospective traveler or a group of travelers who have "written in," indicating their purpose to make a trip to Augusta, Kansas, Georgia, or Maine.

In "writing in" the untraveled usually make the prospect very inviting to the railroad passenger people. The number that is to make the trip is often exaggerated. It is an art to stir the cupidity of the railroad. Passenger men of experience understand these things pretty well, and where ten are promised in the negotiations they count on three to five. The passenger bargains on concessions and price shadings on the sly presumption that the road will do and yield a great deal more for ten than for three

All wrong. The legal limitations take no note of numbers or amount, but cover all acts of the passenger as it does the freight department of a railroad

Twenty-five or thirty years ago the passenger business was a merry calling. The rush to the developing West was on, and there were no legal restraints in a road getting any business in sight in any way it saw fit.

The old-style passenger representative buccaneered on the high seas of adven-

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ture. "Get the business!" was the slogan. It did not make any particular difference what means were used or what treatment was accorded a competitor.

Everything was irregular. Bribery by passes was the universal practise. Every party that traveled had its "bell-wethers," with whom the passenger man made secret negotiations, who got "his" gratis for the strength of his influence in delivering the rest of the party.

A number of bell-wethers in one party, all with the cross-purpose of being the particular leader to get in on the ground floor, each for his own personal advantage and profit, rather entangled and perplexed the passenger representative to pick out with discernment the particular one that really had influence and to side-step the ones who only thought they had.

When it comes to the matter of prestige among one's associates, and the matter of weight and ability to sway others, a man is likely to overestimate his own capacity. It devolved on the old-time traveling passenger representative to spot and eliminate from negotiations all who, in our modern tongue, are known as "four-flushers" and adroitly pick the one member of actual influence.

In these virtuous days of transportation rectitude and equality, when no compensation can be made, no bounties or rewards passed, the business has lost the thrill of the brigand and the footpad and the rough art of plunder, pillage, and spoliation. There is no longer any excitement of adventure connected with it. There remains nothing but to state the case. It may be done fluently or even ornately, but it must be done truthfully.

The business has lost the bell-wether, the secret agent, and its outside influence. It is now without machinations and chicanery. Everything is public and the passenger business survives on its own merits.

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SOME veteran passenger man should preserve in our railroad literature the exploits for business in the stirring days of the seventies and eighties, when there were no restraints. Here is a true story of that period. Take note of the difference between then and now of the practises and ethics of business getting:

Thirty or forty years ago there appeared late one afternoon in the old Union Depot at Indianapolis a party of brethren — members of a particular religious organization, all garbed in a uniform pattern of extreme plainness. Whether to their annual meeting or in homestead migration, they traveled in bodies, and never singly. There were sixteen or twenty in this party.

They had assembled at Indianapolis and were destined to some point in the far West. They were unticketed and undecided as to route when they were spotted simultaneously by the passenger representatives of the A. and B. and the X. and Y. railways, then the competing lines for the West

Both were resourceful workers and so well known that they were known as "Major" and "Colonel." For many years following the Civil War military titles were freely bestowed on well-known characters. As both were in constant guerrilla warfare over passenger business, it was quite appropriate that one should be "Major" and the other "Colonel."

Major represented the A. and B., while Colonel attended the X. and Y. It was quite late in the day when the brethren assembled. The Colonel was first to spot the bell-wether of the party. He succeeded in seeing him privately. The result was that the bell-wether saw at once that the Colonel's road was the one for the party to take.

The Major made the counter move of bribing the next highest—the would-be or near leader — who demurred at the suggestions and recommendations of the Colonel's man and showed sudden and violent preference for the A. and B. line.

The Colonel was disturbed at this unexpected dissension and hinted that the Major was at the bottom of it and that the Major was a rank impostor and fraud. The Colonel knew him well. He knew every foot of that string of junk that he duped the people into believing was a railroad.

The Colonel deplored the fact that such irresponsible characters were allowed to run amuck among the people, hoodwinking and defrauding them. The government should put a stop to it. Indeed, he was so shocked by the outrage

that he expected to see Congressman Puff himself and have something done.

The Major returned the compliment, freely using such opprobrious names as "swindler," "scoundrel," and "windbag" as appertaining and belonging to the Colonel. The Major was certain that, unless improvements entirely beyond reason had been made on the X. and Y., the road was still using strap-iron on wood for rails the greater part of the way out. Every foot of the line was laid in the mud.

"In the mud, sir!" said the Major with vehemence. "The Colonel does not know what gravel is. He has never been out over the A. and B. He thinks gravel ballast is something that goes into the hold of a vessel"

The trains on both roads departed for the West about ten o'clock. The brethren consulted among themselves in a quiet and peaceful manner, but up to nine-thirty had not decided which line to take.

The Colonel and the Major had used up their entire repertoire of billingsgate Lung exhaustion had reduced their speech to an occasional mutter, like the thunder rumbles of a retreating storm.

A strange and unknown brother joined the crowd and circulated a story of how he had made a trip over the Colonel's line the previous season. He told of the many misfortunes that befell him and how his journey was attended with delays, mishaps, and annoyances.

"At last, what do you think they done to us?" he asked, apparently smarting with fresh injustice. "They set us on a side-track a mile from nowhere and locked us in. Like it was a jail sentence, don't you know? No water to drink; nothin' to eat for ten hours. And we couldn't get a word out of 'em what was the matter. That's the kind of a road the X. and Y. is! Of course, it's none of my business what road you go over, understand; but I'm tellin' you, you needn't count me in on that tow-path. I've been over the A. and B., and that's the road for me every time. It ain't no guesswork with me; I know."

The volunteered experience and advice of the stranger had some effect. There was a hurried consultation. The time was growing short.

Suddenly there floundered into the waiting-room a puffing and perspiring wreck. He was daubed with mud and lugged two valises of an obsolete model.

His entry was attended with a howl and a puff. With noise and confusion he collapsed into a seat. He at once had the attention of the whole party.

"Hey, what is it? What's the trouble?" eagerly asked the first stranger.

"Wreck," groaned the new arrival, with what might have been a last breath, but loud enough to be heard by all. "Awful wreck."

"What road?"

"X. and Y."

"Anybody killed?"

"Don't know how many," moaned the survivor, getting his second wind. "Here I am; that's all I know. Track's all tore up. Cars all piled crosswise. They can't get a train by there for more'n a day. I didn't wait. I walked in. Hoofed it, sir, through the rain and the mud! What would I want to stay out there a day for when I'm only five miles from Injinopolis? If you people are going out West on the X. and Y. you'll run right into it and you'll set there all day to-morrow, too. You can count on that, dead sure. The way that track's tore up they can't get it fixed any sooner."

The testimony seemed to be direct and sufficient. The Colonel, representing the X. and Y. Railroad, protested most vehemently that the man was a liar. There was no wreck on his road.

The man said the Colonel was the same and added: "Don't railroads always cover everything up? Don't they always try to hide all the particulars to keep people from knowing what has happened? Wasn't I in it? Don't I know a wreck when I'm in it and when I see it? Hain't I just walked in? Hain't I all wet and covered with mud? Of course, they would say it wasn't so because they want your money. What do you think I'd want to be telling you people this story for if it wasn't so? What do you think I care how any of you go? Ain't no business of mine! But when I've been in a wreck, and walked five miles to get to this depot, all mussed up like I am, I ought to know it, oughtn't I?"

The Colonel raved in furious protest.

"How can he tell anything about it?" argued the survivor. "He's been right here in this depot all the time. Why don't he go out and see? Do you think he'd tell all you people whose going West that you'd better take the other road? 'Course he won't. He's going to bluff it out. That's all."

The testimony and argument were sufficient. The first stranger who had voiced his original prejudices against the X. and Y. now felt fully confirmed and justified in all he had recited. He led the way and the whole party assembled at the ticket window under the personal supervision of the Major and purchased westward over the A. and B.

In truth there was no wreck on the X. and Y. The weird stories told by both the outsiders who chanced in were fiction. Both of the strangers were of the Major's outfit. The one who escaped from the wreck with his life got his mud and dilapidation just three squares from the Union Depot.

The plot was very well staged and very well played out. The Major's road got the business. In addition, the Major had the secret exaltation of having slipped one over on the Colonel, while the Colonel did his level best to have apoplexy.

As for the party of brethren it made no particular difference. They were well enough off, no matter which line they took. They never knew whether there had been a wreck or not. They read no daily papers. As all went well with them and they arrived safely and in good season, they had full value in transportation for their money.

THE incident is narrated to show the ethics of the game only a generation ago—to show, furthermore, that in methods and practises we railroaders have advanced somewhat with the rest of the world. Note the present-day competition. All competitors are honorable and worthy. Everywhere there is the politeness of Gaston and the deference of Alphonse.

The old-time passenger representative was a good horseman. He did a great deal of driving. Calling on prospective patrons in the country and in inland villages made it necessary for him to hire rigs right along, and he learned to become something of an expert in the art of handling the miscellaneous outfits that he hired at the various livery-barns.

The Colonel who lost to the Major, as told above, was a good judge of horses and always demanded the best steppers for any trip he had to make into the country. The title Colonel suggests Kentucky hills and blue grass, which, in turn, bring to mind the spirited high-stepping thoroughbred. So it is fitting that the Colonel should be a horseman.

The Colonel got a line on a farmer who was figuring on going to California with his family. There were five in the party. They were in the country, seven miles from any railroad station, and the Colonel, without any special appointment, drove out to see the farmer.

The liveryman gave the Colonel a "near speeder"—in a horse that had been on the track for a time, but had failed to arrive. The owner boasted that he could go around two-twenty with a buggy along the country road. This delighted the Colonel. He located his party. He was to go five miles south to a schoolhouse and a church on opposite corners, thence west two miles to a narrow bridge, the first house beyond which was the home of Isaac Polk, the prospective traveler.

The Colonel came to the corner marked by the schoolhouse and the church and turned as directions indicated. A good stretch of country pike lay before him. Just ahead was a man driving listlessly along in a buggy.

The Colonel tapped his horse and turned out to go around the other outfit. The man ahead suddenly detected this maneuver. Up to that moment he had been telescoped into his seat in an impassive and dejected hump, jogging along without concern. He suddenly galvanized into life, gave a signal jerk on the lines and a sharp word of command, and was off.

The Colonel's horse lunged forward with the snort of the track in his nostrils and with visions of the race and the home-stretch before him.

The Colonel expected to pass easily; but the old flea-bitten mare laid back her ears, stretched her neck, and went down the road at an amazing clip. It was an even bet from the first jump.

They went a mile, and the Colonel fell

behind and took the dust. The countryman, triumphant but docile, again scooted down into his seat as if there had been no excitement, and went along at the same slow, jogging pace as before.

But the Colonel was determined to pass. He had been scooped and beaten many times by his competitors in the railroad business, but for a "rube" with a plow-horse to lead him with a racer that had a record of 2.20 was too much of a humiliation.

The Colonel used his wits.

Ahead was the narrow bridge. He moved up closely behind and by a quick movement was slightly in the lead before the countryman could again unwind himself and get up steam.

The Colonel jockeyed him out of position, crowded him, and made for the bridge. The countryman was obliged to pull up, as the bridge was too narrow for both.

The Colonel went over ahead, then turned and lifted his hat to the vanquished.

Just ahead was the home of Isaac Polk. The Colonel turned his panting horse into the barn-yard.

So did the countryman—right behind him.

"You git!" yelled the countryman.

"Say, you ain't Isaac Polk, are you?" asked the Colonel, with sudden misgivings.

"Maybe I am or ain't. But that's no concern of yourn. You keep a movin'. You dig!"

The countryman had crawled out and was looking for some loose missile to hurl at the Colonel's head.

"If you'd 'a' raced fair and beat me I wouldn't 'a' kicked; but, durn ye, you cheated! You crowded me into that bridge! I don't care who you are or what you want, you git, and don't lose any time doin' it, either." He let out a whistle. It brought a bull with an underslung jaw.

The Colonel backed out into the road. Notwithstanding the stir of police calls and fire alarms, an idea came to him. Here was a chance to get even with the Major for his trickery in securing the brethren's business.

"Mr. Polk," he said, "I wanted to see you about that trip to California. I represent the A. and B. railroad (Bear in mind the A. and B. was the Major's road.) We want to sell you tickets over our line."

"Well, you don't!" retorted Polk warmly. "I'd walk all the way out there before I'd buy a ticket over any road you stand for!"

"Well, I'll tell you, Polk," rejoined the Colonel just as hotly, "you needn't think the A. and B. cares a cuss! We will continue to do business at the same old stand! If you don't like our way of doing things you can go to."

With this outbreak of independence the Colonel tapped his horse and was off for town, satisfied that he had unloaded all the infamy and reproach of the incident onto the Major's road.

On the next day, while the temperature was still at the sizzling point under Isaac Polk's collar and his indignation and umbrage were fresh against the A. and B., the Colonel sent out one of his associates, who landed Mr. Polk for the X. and Y. All of which shows that when it comes to cat strangulation, oleomargarin is not the only material; or, whichever way you view the case, the Colonel is something of a jockey, whether as a horseman or a passenger solicitor for the X. and Y.

BOTH the Colonel and the Major lived long in this land of strife, but both have now gone to the reward that awaits all good railroad workers. Between them honors were even. They were repeatedly outwitting one another, and they so early exhausted all the invectives and anathemas of our tongue as was as applicable to each other that language soon lost its potency and rancor and hatred became useless and unavailing and they became warm personal friends.

From the empyrean fleece they now watch the antics of their successors who work calmly, cautiously, and judiciously under the ever watchful I. C. C. There is no more uproar or commotion in competition.

Twanging the "G" string of his harp, the Colonel observes to the Major: "Ain't like it was when you and me were on the job!"

The Major runs an octave and says to the Colonel: "Ain't that the truth? Wonder what has happened?"

Boarding the Mail.

BY TEX HOUSTON.

Why the Chevalier Found It Necessary to Build a Fast Cruiser for a South American Republic.

A FEW miles northeast of Florence, among the foot hills of the Etruscan Appenines, is the favorite estate of the Chevalier Alessandro Busoni. He it was who discovered and his was the energy that developed those measureless veins of precious metals in Chili that would have surpassed the Klondike in attracting fortune-seekers if it had not been that a shrewd Italian obtained such concessions from the government as to preclude the possibility of competition.

Where the venturesome prospector would have staked out a modest claim Busoni took a mountain; instead of tracts subdivided among hundreds of individual owners, there were entire provinces controlled by Busoni.

To him the gaining of immense wealth had been a means, not the end, of his endeavors. All through the arduous period when he was breaking into the treasure vaults of the Andes this life had been the dream that inspired him. Far off, well-nigh unrealizable it seemed then.

Often, when physical difficulties were all but insuperable, when he had to overcome not only the resistance of those adamantine walls, but the hostility of aborigines, when he had to scatter or annihilate whole tribes that his stamp-mills might be operated in safety -often had he feared that this strenuous life would unfit him for the scholarly pursuits of leisure.

Later, when the mountains began to yield in abundance, when the outpouring of treasure exceeded the cost of gathering it, he used to cover scraps of paper with calculations designed to apprise him of the time that must elapse before the accumulation should be so great that he could dispose of the mines or leave them to be worked by others.

The time had come sooner than could have been predicted from his most sanguine calculations, and he was now in the full enjoyment of tranquillity, honor, and the attainment of knowledge.

The distant mines were still pouring forth abundance, and abundantly Busoni gave to charity, to learning, and to the church. Knighthood had been bestowed upon him in recognition of the benefits he distributed, and other distinctions—academic and of state—were in prospect.

Busoni went occasionally to Genoa, where a battalion of clerks and secretaries kept account of his affairs, for he could not, or at all events did not, divorce himself utterly from business; but it was less his material interests that called him there than a desire to pass a day or a week with the Baron Francesco Napolini, his friend from boyhood

The baron was accounted as the richest man in Italy by those who did not realize the extent of Busoni's possessions. It was not great wealth that drew these remarkable men together. On the contrary, it may be said that it was the baron's wealth that kept them apart for more than twenty years.

Napolini went from school to the university, and from the university to his library, where he continued his researches in the various departments of human knowledge until he became au-

thority on many subjects; Busoni, comparatively limited in means, halted at the very doors of the university, foreseeing that a course of study there would exhaust his resources and bring him to serious life with naught but the slender capital of a little learning

Napolini would have provided for his friend; indeed, he offered Busoni a secretaryship, nominal in responsibility generous in salary, in order that they might cultivate learning together; but there was one thing that Busoni prized more highly than opportunity to study, and that was independence.

So one delved in the serene fields of the world's accumulated knowledge, while the other hammered at rugged mountains.

Materially, they were now on even terms, with the advantage in Busoni's favor in that the golden stream rolled its silt in ever increasing volume to his hands, while Napolini's fortune prospered with more gentle increment.

In the other matter advantage lay immeasurably with Napolini. His store of knowledge had become so great that any other than Busoni might well have despaired of approximating to it in the years that remained for him. Busoni, however, had acquired one other thing of which easier circumstances had deprived his friend: the habit of incessant energy. His mental powers were mature, his mind as freshly receptive as it had been when he abandoned books for the hammer.

He applied himself with a giant's vigor to one subject after another, often several at a time, in literature, art, science, philosophy; and he astonished and delighted the placid baron with the rapidity of his progress and the retentiveness of his memory.

If such a thing were possible, Napolini took more interest in his studies than did the chevalier himself. They were much together, therefore; now at Genoa, now at the beautiful estate in the suburbs of Florence. Napolini exercised a welcome oversight of Busoni's studies, advising courses and recommending teachers; and Busoni revered the baron as a master quite as much as he esteemed him as a friend.

There were times when Busoni's house seemed like a university with a numerous faculty and one student. Many a distinguished professor earned a year's salary by becoming Busoni's guest during the vacation season, and men of learning were ever welcome, whether they came by arrangement to instruct him or as unbidden visitors.

One man, Dr. Paolo Paldrone, was retained from year to year as a member of the household in the capacity of Busoni's mentor, or, as the chevalier in those rare moments of humor styled him, the president of the faculty.

Paldrone was a man of encyclopedic attainments. If there were a subject which he had not mastered, and he himself admitted that there were many, he knew just where to seek for authoritative information and just how to glean the salient points and discard the valueless

As a guide to learning, Paldrone was invaluable to the chevalier, and between them there developed a friendship that was intimate, wholly mutual, and not in the least affected by the fact that the doctor was dependent upon the chevalier for his income.

It may be imagined that the Chevalier Busoni was the most contented, if not the happiest, man in Italy. The dream of his youth was more than realized. Whatever the world might give him in return for wealth was at his command, no matter how extravagant might be his desires

Just what he desired most was his in superabundance. Nevertheless, after a few years of pure delight, a subtle change crept in upon his demeanor. Dr. Paldrone was the first, perhaps the only, one to notice it.

For a time the doctor said nothing, observing the manifestation studiously and trying to analyze it. The most significant symptom, so to speak, was restlessness. A brief period of moody reflection would be followed by intense, feverish application to study, as if to make up for lost hours; but the precise line of study might be abandoned arbitrarily for the sake of some other of diametrically opposite character.

This was unworthy of a serious student; it was unlike Busoni, and Dr. Paldrone marveled. Had long years in the mines bereft the chevalier of staying power? Was he incapable of that

prin . requisite of profound scholarship, unremitting continuity of effort? In view of all the past, this seemed a most unlikely supposition, and yet, for two months or more, study had been desultory and profitless.

One day the chevalier announced abruptly that he was going to take a journey.

"To Genoa?" asked the doctor, hopeful that contact with Baron Napolini would reinspire his friend and patron.

Busoni's brow clouded.

"No," he answered; "I shall not go to Genoa at this time. Rome, Leghorn, Venice, possibly elsewhere, but not to Genoa"

He was away a fortnight. On his return he greeted Paldrone with unaffected cordiality, and, after kindly inquiries as to his mentor's health, he asked: "Are we honored by the presence of savants, doctor?"

"No, chevalier," replied Paldrone; "we have the university to ourselves."

"That is good, for I wish to complete certain researches without interruption, and I am especially in need of your undivided attention

The doctor was delighted, for this was promise that the chevalier's subtle distemper had passed; but hardly had Busoni ceased speaking than his brow was overcast and his features took on an expression of profound gloom.

"My friend!" cried the doctor, sincerely alarmed, "there is something the matter. You have been troubled for a long time. Will you not confide in me? I cannot imagine what can give you uneasiness. Tell me, chevalier!"

"So you have noticed it," said Busoni somberly; "I feared you would. Yes, I mean to tell you, for I need your help. If I did not need you I would not burden you with it."

"What can it be? What—"

Busoni checked further inquiry with a bitter laugh.

"Strange, is it not," he demanded, "that I should grieve, I, who have all that the heart of man could wish; or, to be more precise, all that my heart can wish? Yet it is so. We shall see. Tomasso has taken my bag to the library. There are documents in it that I wish to refer to. Let us talk there."

The library was a spacious apartment, sufficiently but not glaringly lighted, provided with all the appurtenances of study, its many alcoves gorged with books, the whole instinct with an atmosphere of peace such as nature in her serenest mood cannot surpass.

Here the changing seasons brought no change of aspect; here no tiny thing was prey to greater force, no tempest raged that could efface a landmark or modify the course of smallest rivulet. Yet this was not the peace of death.

The majestic serenity of eternal life breathed from those volumes ever ready to yield up the wisdom of centuries, and no research, no indefatigable poring over their pages could make their contents less. They were to-day as they were yesterday and as they would be to-morrow.

"Doctor," said Busoni as he opened his bag and distributed books and documents over a table, "could a desire common to the several members of a family disappear, or lapse, for several generations and reappear with all its original force in a descendant?"

"You have become interested in the recurrence of some trait in an ancestor, commonly called atavism," responded Paldrone.

"Answer me, doctor."

"I should say yes, with some reservation as to all its original force. That a family desire, trait, tendency, type, or what not, may lapse only to reappear is well established," and the doctor launched into a long dissertation on intermittent heredity. Busoni listened intently, as was his custom, and only when the lecturer paused did he ask a question:

"All this would be equally possible, would it not, if the tendency—or desire, as I prefer to call it—was vengeance?"

Dr. Paldrone's heart sank, he could not tell why

"I can conceive it as an atavistic possibility," he answered.

"Even after a lapse of centuries? Come, doctor, do not hesitate, and discard your caution. We are men of science now, and we seek rather than avoid the truth. What say you?"

"There is nothing inconceivable in it," said Paldrone slowly and apprehensively; "atavism concerns itself

mainly with the recurrence of barbarous traits or tendencies, and in our present civilization we commonly regard the desire for vengeance as partaking of barbarism."

"Just how we regard the desire for vengeance," responded Busoni, "can have no scientific or philosophic value. Look at this."

He unfolded one of the documents that he had taken from his bag and spread it upon the table. Dr. Paldrone saw a genealogical chart of the Napolini family.

"You will observe," said Busoni, "that this exhibits the development of the family from about the beginning of the fourteenth century. Note first that the line of direct descent terminates with the present Baron Francesco Napolini, of Genoa.

"Now observe that he is the only living member of the immediate family. Many of the collateral lines, you perceive, have become quite extinct, and others have departed so far from the main trunk as to be submerged in humanity generally.

"That is, the present members of most of these collateral lines have lost all individuality as Napolinis. It would be absurd, for example, to regard this Signor Pedro Morello, of Leghorn, as a Napolini. He does not so regard himself; in fact, is quite unaware that two hundred years ago there was indirect connection between his family and that of the Napolini."

"Did you go to Leghorn," asked Paldrone, "to learn that?"

"I went to Leghorn and elsewhere to enlarge and verify this chart. You may rest assured of its authenticity. The salient fact is that Baron Francesco is the only living member of the family."

"Yes, that is clearly established."

Busoni brushed aside the chart and walked hurriedly to an alcove, whence he came with a volume

"It is a history of Sicily," said he, and opening at a marked page he began to read aloud.

"'About the end of the fourteenth century that part of Sicily was greatly disturbed by a feud of extraordinary violence between the families Napolini and Genovardo.' The book goes on for several pages, doctor, to discuss the origin of the feud and its tragic progress. Permit me for the moment to omit the details that show how a Genovardo killed a Napolini, and then how a Napolini killed a Genovardo, and so on in alternation, and come to the passage in which the historian dismisses the matter.

"'At length peace was restored to the province by the process of extermination. The Napolinis triumphed so far that there was but one Genovardo left alive. This Genovardo gave up the unequal struggle and fled to the mainland, settling in Tuscany, where he was known as Busoni. That with his name he abandoned the vendetta is evidenced by the fact that the Napolinis have ever since been undisturbed.'"

The chevalier closed the book and looked across the table at his friend and mentor.

"It is from that Busoni, that recreant Genovardo," he added, "that I am descended."

"Can you be sure?" began Paldrone hastily, when Busoni interrupted.

"Doctor!" he cried. "Have you taught me to study that you ask me that question? Satisfy yourself, if you will. These papers for the most part consist of notes and résumés of my reading on the matter. You will find various references to that famous feud, but, more to the point, you will find flawless demonstration that I am a descendant of that Busoni who was a Genovardo. You know that no law of physics or philosophy is more certain and inexorable than the law of vendetta: a life for a life."

Paldrone shuddered. "There are other descendants of this Busoni," said he; "you have living relatives."

The chevalier's face took on an expression of acute pain and there was a perceptible pause before he controlled himself sufficiently to speak.

"Doctor," he said then, "there is but one Napolini left. Let me not remind you who he is. All my relatives are as ignorant of this unhappy circumstance in history as I myself was until a few weeks ago. Can you imagine me under the circumstances, or under any circumstances, inciting another to do what I would not do myself?"

"You must not dwell on this, my friend," exclaimed the doctor; "the feud perished when that ancient Genovardo took himself from the world by dropping his name and founding a new family with which the Napolinis are at peace, not enmity."

"False reasoning, doctor; false, and you are wise enough to know it. Bear with me. Let us rather say that vengeance is repugnant to that lofty plane of civilization from which the scholar looks down upon the world. Let us assert that friendship revolts at the deed that vengeance marks out. It is so! I have said it again and again, but vengeance cries aloud and will not be silenced

"When first I read that passage and thought that I might not be connected with that Busoni, I hoped I was not, my blood tingled with shame that any man could be so recreant. I could not rest until research should satisfy me that I was in no degree affected by the obligation of the Genovardos, and the more I sought the more clearly it appeared that I was, that I am involved.

"How I have battled with the black idea! It has possessed me! It has come like a poison into my life! I cannot run or hide from it, as did the ancient Genovardo, and I fear, doctor, that I shall not be cured *until I have killed my friend!*"

He pronounced these last words in a shuddering whisper and perspiration glistened on his brow. Greatly distressed, Paldrone knew not what to say, what argument to adduce that might resist successfully the impulse.

"Come," said Busoni, after a painful moment, "let us go out and chase butterflies."

The doctor hailed the suggestion with relief, and both went to get their nets and naturalists' haversacks. For two hours or more they hunted the beautiful fields of the estate, pouncing upon the gaudy insects.

Not once was the black idea mentioned by either of them. At length they sat upon a knoll to rest. Then the thoughts that had been dormant in Paldrone's mind during the chase became active. He knew how vain it was to reason against the impulse that had been aroused in the chevalier, and he sought, therefore, to arouse a contrary impulse by discussing a pet scheme of Busoni's—the establishment of a great university upon this very estate. It was a one-sided discussion.

"Doctor," said Busoni suddenly, "do you see that butterfly?" and he pointed. Yes, Paldrone saw a yellow-winged insect settling upon a flower about a dozen paces distant. "It will rise again in a moment," added Busoni; "watch it."

The butterfly rose and fluttered away. Immediately Busoni's hand rose also. It held a revolver. Without perceptible pause for aim, he fired.

A few shreds of yellow zigzagging to the ground manifested the insect's destruction.

"In the name of Heaven, chevalier," exclaimed Paldrone, aghast, "why did you do that?"

"It is the black idea," answered Busoni moodily. "I have not fired a weapon since I was in the Andes; I have not even carried one since my return to Italy until this afternoon. I merely wanted to test my very poor marksmanship."

He wrote a long letter to the baron that evening, in which he set forth his discovery and researches.

"Advise me," he concluded, "if I am in error as to the facts. If I am correct, give me your candid opinion as to what is incumbent upon me. I cannot enter into the arguments with you. I have been over them patiently again and again in my own thoughts. Oh, my dear friend! if there were but some other of your blood, some Napolini unworthy of life, how gladly would I relieve him of it and thus wipe out the stain that the recreancy of Genovardo has cast upon me! There is no other than yourself against whom the hand of vengeance can be raised. Pity me, my friend, and be warned, for I shall not dare to face you until my unhappy mind is resolved of its last doubts."

For three weeks Busoni waited vainly for an answer. He became more and more distraught and gloomy as the days passed. Paldrone could interest him in no study, could not fix his attention, even momentarily, on the proposed university.

At length the chevalier went to Genoa. He visited first his business friends, but

he ignored the transcripts of accounts that his secretaries placed before him.

There was a letter there from the baron. It had been brought by the baron himself, with word that it be held to await the chevalier's call.

"My dear Alessandro," it read. "I have been cognizant of the facts you state for many years and have dreaded lest you should come upon them. I confess that I even directed your reading with a view to keeping you away from them, but your admirable studiousness has defeated me. What it is incumbent upon you to do I cannot presume to say, for I would not put myself in the attitude of begging for my life, not even from my dearest friend, and such I have been proud to esteem you. It is you who must decide this momentous question. As for myself, I take warning."

Busoni went straight to the baron's house. It was closed; but he learned that nearly three weeks previously the baron had sailed for New York.

From that moment the chevalier's course was decided—not by Napolini's letter, but by his flight—and then began the most remarkable pursuit ever known in all the annals of vengeance.

Busoni cabled a New York correspondent to stop at no difficulty and spare no expense in locating Baron Napolini and in observing his movements.

An answer from New York the next day apprised him that the baron had arrived in that city and was installed at one of the fashionable hotels.

The chevalier cabled a long letter of instructions and took train for Paris, whence he went to Havre and boarded a western-bound steamship.

Before he sailed he learned by cable from his New York correspondent that the baron had suddenly departed for the West, supposably San Francisco.

"Follow him and have reports ready on my arrival," was the chevalier's return message.

Eight days later in New York he read telegrams from various cities in the United States, all from the correspondent who had been tracing the baron's movements. The latest showed that the baron had arrived in San Francisco. Within two hours Busoni was speeding across the continent in a special train.

Would it cost so-and-so much more to hold a passenger-train upon a siding for an hour in order that his car and engine might pass? Busoni paid it.

Would it demoralize freight traffic over a considerable section where there was but a single track to give him the right of way?

Busoni made a deposit to indemnify the managers from all possible suits for damages.

Midway in the journey, where a momentary halt was made to change locomotives, Busoni received another telegram.

The baron had gone to Victoria the day after Busoni started from New York, presumably to take passage on one of the China mail steamships.

"Have a special train ready to start for Victoria immediately on my arrival," Busoni telegraphed.

The correspondent obeyed, and nothing occurred to cause serious delay; but when Busoni arrived in Victoria the steamship was a day out on the Pacific with Baron Napolini among the passengers.

It was then clear to the pursuer that Napolini had left agents everywhere, from Genoa to Victoria, with instructions to keep him informed of the chevalier's movements.

Thus it was that the baron had always made a new departure within a few hours after the chevalier had made a start; but when the race began they were four thousand miles apart, and at this point the baron was but a few hundred miles in the lead.

Busoni, therefore, was far from despairing, in spite of the fact that his quarry's lead must be greatly augmented before he could be on the chase again.

The chevalier waited with such patience as he possessed until the next boat sailed for Asiatic ports. In due time he was journeying from one to the other, sometimes on the baron's track, sometimes hunting for it.

Wherever he went he arranged for agents to send him information at no matter what cost if at any time news of the baron developed.

Not a day passed when he was on land that he did not cable inquiries to places ahead; and so, when at length

he had made the circuit of the globe, he knew that while he was toiling through the Suez Canal Napolini was rushing from London to Liverpool, whence he promptly sailed for Buenos Ayres.

At this point Busoni apparently rested. He spent two whole days quietly at his estate near Florence; but while Paldrone babbled of the university, the chevalier thought of the chase.

Meantime, the faithful telegraph was doing his work for him, so that when he appeared in his offices in Genoa he found the minister of Chili waiting for him.

"I received your telegram," said the minister, "and came without delay. My country is highly appreciative of Chevalier Busoni's efforts in her behalf—"

"And I," interrupted the chevalier, "am appreciative of the benefits that Chili has conferred upon me. I wish to testify to my gratitude by presenting to the government a modern cruiser of the highest possible speed. I presume you could make use of such a vessel?"

"Indeed, yes, chevalier! Permit me to thank—"

"Later. I cannot wait for it now. You must give the order for the building of the boat, but all specifications must be submitted to me, and speed, with the greatest possible coal capacity, must be the first consideration.

"Ostensibly, you will pay for everything, but I will provide the money. You must give the builders not a day more than a year in which to complete the craft. When she is ready for service she must be delivered to me at some port on the Pacific Ocean that I will name. I must have four weeks of private use of the boat, after which I will place her at the disposal of your government. And all of this arrangement must be regarded as an inviolable secret between your government and me."

Mystified, but delighted, the minister undertook to give the order, and, as money can move railroad trains, so the keel of the new Chilian cruiser was laid within a week.

By that time Busoni was on his way to Brazil. He did not journey this time with the impetuous haste and eagerness that marked his first circuit of the globe, for it availed him little.

Napolini, too, had unbounded wealth, and he spared no cost to keep himself informed of his pursuer's whereabouts. So the chase went apparently as before, over a different track, but with the same features.

To Napolini it was as critical as the first, for now and again he would hear of Busoni but a few days' journey behind him, and then, by dint of the most strenuous endeavor and the expenditure of fortunes, he would place half the world between them.

This dodging from continent to continent, from ocean to ocean, consumed quite a year, and when for the second time Busoni came to Florence from the east Napolini was in New York.

For the second time Busoni apparently rested, but it was merely to enable the Chilian cruiser to make the voyage from the Clyde to the Pacific coast.

When he was assured that she was at her destination, the chevalier said to Paldrone:

"Doctor, I am weary of traveling alone. Come with me. Maybe we will settle all plans for the university on the way."

A day or two after this Baron Napolini was informed by cable that Busoni had started once more for America. Grimly he prepared for another flight. He had learned how, and the devices that succeeded when he had to invent them hurriedly seemed all sufficient to protect him now.

The baron crossed the continent and took passage at Victoria for Hong-Kong. He learned of Busoni's arrival in New York a few hours before his boat sailed.

It was toward the close of the ninth day out from Victoria that the passengers on the China mail were interested in a column of smoke that discolored the eastern horizon.

It grew and grew, and presently the funnels from which it belched could be distinguished with a glass.

The officers on the bridge looked back at it and marveled. To their trained observation it was already evident that the coming boat had amazing speed. Soon it became clear to the dullest passenger that the China mail was being overhauled by the low-lying boat from the east.

Questions flew from mouth to mouth. The officers shook their heads and kept their eyes glued to their glasses. They could not answer.

On the bridge the first officer remarked to the captain that she seemed built for war service

"She carries no guns," responded the captain.

"But what a flier!" exclaimed the first officer; "she must be making three miles to our two!"

Signals of inquiry were shaken out at the coming stranger, which as yet had displayed no flag of any kind, but they were ignored

The captain was offended at this breach of marine etiquette, but not in the least alarmed. Had the China mail been nearer the Asiatic coast there might have been ground for apprehension, but who ever heard of pirate sailing such a trim, modern, swift craft as that?

Finally the strange steamer veered from her course a bit and showed that she intended to pass the mail steamer on the starboard quarter. Not a passenger or officer failed to take in the spectacle. Even the stokers came tumbling up from their inferno to cool their naked backs in the breeze and feast their eyes on the racer.

On she came, and the hiss of the white torrent at her prow was audible above the black roar of her funnels. As she began to pass the mail it seemed that a child might easily have tossed an apple from the deck of one ship to the other.

Three men were standing on the bridge of the stranger — one evidently the sailing officer, the others apparently passengers, for they wore no uniform and stood close to the port quarter, scanning the big ship sharply.

Suddenly one passenger on the mail gave a low gasp of horror and started back from the rail. Another, who had developed a warm traveling friendship for him, also turned away.

"What is the matter, baron?" this one asked.

"I feel as if I had looked death in the face!" replied the baron huskily, and he added at once, "but do not mind me. I will go to my room, where I may compose myself. I am much interested in this passing boat. You might come to my room presently and tell me about it."

"You are sure there is nothing I can do? Shall I summon the ship's surgeon?"

"No, thank you very kindly, there is nothing to be done. I expect to be all over it soon."

The baron, with bowed head, crossed the deck to the saloon companionway and disappeared.

His acquaintance gave further attention to the passing boat. It was just now beginning to forge ahead of the mail, and the two passengers upon the bridge were looking backward.

They were still scanning the lines of faces along the decks of the mail. As the swift craft's stern came into view her name and port were seen upon her freeboard: "La Vendetta, Valparaiso."

The wise ones among the passengers told their less gifted companions that this was a new war boat out for her trial trip, and if any were shrewd enough to ask why the trip should be extended to midocean the question was evaded or argued.

There was no less amazement on board the mail when La Vendetta, after going sufficiently far ahead, deliberately crossed the bows of the big ship and steamed back, passing very close, this time on the port side.

As before, the rails of one vessel were crowded with eager faces and the bridge of the other occupied with the sailing master and the watchful passengers.

Not a few greetings were hailed across the narrow space that divided the boats as they passed, swiftly this time; but there were no answers from La Vendetta.

Presently the baron's acquaintance called at his room. He found the baron perfectly composed, but deathly pale.

"I fear you are seriously ill," he said.

"No," replied the baron, "I am well What of the swift boat?"

"La Vendetta," began the other, when the baron caught him convulsively by the arm.

"Ah!" he said, controlling himself, "La Vendetta, the name of the steamer. Yes, I understand. What of her?"

"She passed us a second time, going

the other way," returned the wondering acquaintance, "and now, having put about, is overhauling us again. The officers of our ship evidently think it very strange. I can see that the captain is much put out; not alarmed, I suppose, but disturbed by such mysterious actions."

"Overhauling us again," repeated the baron slowly. "It is as if a noose had been cast around us and were being drawn tight. Yes, a noose, or a net, in which I am enmeshed. My friend" — and the baron put his hands on the other's shoulder — "I am physically and mentally a well man, but I tell you that my end has come. This is no idle boast. When that boat again comes alongside I shall die."

On deck was no end of restlessness. What had caused the passengers at first but agreeable curiosity now filled many with vague dread and others with unreasoning excitement

The officers' features were set in expressions of displeasure. It was as if a well-to-do citizen saw a suspicious-looking character prowling persistently about his grounds.

Again the swift La Vendetta pulled alongside, closer this time than before, and just when the two boats were abeam a detachment of sailors on La Vendetta suddenly swarmed upon her deck and let buffers over her side.

It was plain to the most untrained eye that one of her passengers intended to leap aboard the mail.

Fierce orders issued from the bridge of the big steamship; subordinate officers hurried to the main deck amidships.

The captain went to his room for his revolver. This uninvited boarding of a vessel in midocean, if not bald piracy, was invasion, and international law would sustain resistance to the uttermost

At just the moment when the buffers between the iron hulls were about to be crushed Busoni leaped from the bridge of La Vendetta, clearing the rail of the big steamer and landing squarely on the deck.

He was a second in advance of the first officer to arrive. The seamen who were near drew back, alarmed, as they saw the weapon in his right hand. He staggered from the force of the leap and fell

Before he could regain his balance the captain of the mail was at hand with raised revolver.

The range was so short that a miss was impossible; but as the captain pulled the trigger his arm was struck down by a pale passenger, who had come rushing aft from the companionway to the main saloon.

The report of the revolver sounded weirdly feeble away out there in mid-Pacific, and the bullet plowed a harmless hole in the deck.

Before the astounded captain could take new action or say a word, Baron Napolini stepped in front of him.

"Shoot, chevalier!" he said. "Let it be quickly over!"

Busoni's arm was half raised, but it trembled violently. His weather-bronzed cheeks grew ashen and his body trembled.

"You save my life for this, Francesco?" he stammered.

The consternation of the captain and others was but momentary, and a rush was made for the invader.

Before they could lay hands upon him he dropped his revolver into the sea, leaned his head upon the rail, and shook with sobs.

There was a long conference in the captain's room, whither at Napolini's urgent request the invader was taken. Meantime, La Vendetta steamed along within hail.

Finally there were signals from the mail that La Vendetta deigned to answer, and in accordance with arrangements thus made a small boat put off from La Vendetta and took away both the baron and the chevalier.

The captain of the mail may have made all the requisite entries in his log, but when La Vendetta put about again and made for her port he was a richer man than he had ever hoped to be, and with assurance of still greater riches if his employers should see fit to discipline him for permitting the invader to go free.

And in the cabin of La Vendetta three quiet, but supremely happy, savants were discussing the details of the great university to be established near Florence.

By the Light of the Lantern

Ask us what you want to know

WE want to be as useful as possible to our readers, but, because of the great popularity of this department, we are obliged to impose certain restrictions. It is limited to the answering of questions of an informative, technical, or historical nature only. All letters should be signed with the full name of the writer, as an indication of his good faith. We will print only his initials. The editor begs that readers sending in questions will not be disappointed if the answers do not appear as early as expected. It frequently takes weeks to secure correct answers, owing to the complexity of the questions.

IS it necessary to face and spot the valve-strips of an Allen port-valve to the pressure-plate?—C. H. H., Sharon Springs, Kansas.

No. All that is necessary is to be sure that the strips are perfectly straight on their upper edges. The strips and pressure-plate will form a perfect steam-tight joint by friction in a few hours' service. The same applies to the valve-seat and valve-face.

WHAT per cent of a locomotive's power does it take to pull itself?—C. R., New York City.

Assuming that the track is level and straight, and assuming further that the locomotive weighs 150 tons, and has a tractive-power of 30,000 pounds, it will take a tractive-effort of 16 pounds per ton to start the locomotive. This would amount to 2,400 pounds, or eight per cent of the entire tractive-power of the locomotive. As the locomotive increases in speed the tractive-effort required to move the locomotive diminishes to about 6 pounds per ton at 8 or 10 miles per hour, which would be about three per cent. As the speed increases, the ratio of necessary tractive-power also increases, until at 125 miles per hour it would require the entire tractive-force of the locomotive to keep itself moving at that velocity.

WHAT are the conditions and qualifications necessary to hold a position as safety-appliance inspector on a railroad?—C. E. W., Johnstown, Pennsylvania.

A complete practical knowledge of the appliances now in use, with the ability to make reports upon the same, and as a prerequisite a certain period of active experience in railroad operations.

WHICH is the fastest train in the world, and the fastest train in America?

(2) What was the nationality of the man who invented electricity and steamboats?—E. B., San Francisco.

An answer to the first clause of this question was published in the December, 1912, issue of this magazine, and an answer to the second clause in the May, 1913, issue. Both answers were exhaustive and have been received as standard authority.

(2) In answering this question it should be borne in mind that electricity is not in any sense an invention. It is a manifestation of the mysterious working of natural phenomenon, and was observed by Thales, of Miletus, (600 B.C.). Both Theophrastus (321 B.C.) and Pliny (70 A.D.) made many observations and experiments on the power of electricity. The first two named were Greeks. Pliny was a Roman. It was reserved, however, for Franklin, Volta, Ampere, Ohm, and Farraday, with a few others, to discover the laws which govern it. The development of what may be called the service of electricity in its application to human needs may be considered to date from the time of Farraday, whose long and brilliant career ended in 1867.

The first successful steamboat was constructed on the Forth and Clyde Canal in 1789 by William Symington. It was objected to by the directors of the company, as they claimed that the action of the paddle-wheels damaged the sides of the canal. Symington was a Scot, and in regard to the priority of his claim to the adaptation of the steam engine to navigation there can be no doubt. The complete mechanical as well as commercial success of the steamboat must, however, be

credited to Robert Fulton, the eminent American engineer.

HOW many locomotives, cars, and miles of track has the Northern Pacific Railway?

(2) What are its terminals, officers, and by what line is it controlled?

(3) What is the cost of Poor's Manual, and where can I obtain a copy?—C. S A., Korbel, California.

There are 1,433 locomotives, 1,161 passenger-cars, 49,775 freight and miscellaneous cars, and 6,043 miles of track in operation.

(2) The extreme terminals are Minneapolis and Duluth, Minnesota, Vancouver, British Columbia, and Seattle, Washington. Howard Elliott, St. Paul Minnesota, has been president for a number of years, but has been chosen president of the New York, New Haven and Hartford road. Mr. C. A. Clark, St. Paul, Minnesota, is treasurer, and Mr George H Earl, New York City, is mechanical superintendent. The Northern Pacific Railway is not controlled by any other corporation or company

(3) Ten dollars. Poor's Railroad Manual Company, 535 Pearl Street, New York City.

I NOTICED the fireman on an engine watering the coal with a hose. Why did he do that?

(2) What are the chances of getting a job firing out West, say California?

(3) Are oil-burning locomotives used exclusively out West?—H. B., Hattiesburg, Mississippi

Sprinkling coal previous to its being placed on the fire has the effect of adding to the cohesive quality of the smaller particles of coal, which otherwise, on account of their lightness, would rapidly pass through the flues before complete combustion had taken place. A certain amount of water aids in the economical use of coal

(2) The chances are good, but a fireman in the South should not expect to find a job waiting for him in the West. It is purely a matter of chance.

(3) No. The percentage of oil-burning locomotives is greatest in the Southwest.

KINDLY give some information regarding engines of the No. 300 class running on the Philadelphia and Reading between Camden and Atlantic City, New Jersey. I understand they have made the best records in the world, and are much discussed among railroad men.—W. J., Camden, New Jersey.

The locomotives that you refer to are of the three-cylinder type, and have made records occasionally averaging 75 miles per hour—that is, they have made the distance between Camden and Atlantic City, 55 miles, in 44 minutes. For a comparison of records see the December, 1912, issue of this magazine, also the May, 1913, issue. It has been frequently shown that the variable effect of the unbalanced force of a two-cylinder engine effects a difference of as much as 134,000 pounds in rail-pressure in each revolution of the driving-wheels. In the three-cylinder engine there being no unbalanced weight, the cranks being set at 120 degrees apart, it is not only possible to operate this type of engine on a much lighter rail, but a higher degree of speed can be maintained with the same amount of static energy. The increased uniformity of turning action is clearly beneficial in lessening the racking effect due to sudden and violent reversals of strain in the machinery of the locomotive.

HOW would you proceed to set a Walschaerts valve-gear with the port openings as follows: left side of the engine, forward gear, ⅛ of an inch opening in front, 7-32 of an inch in back. Back gear 9-16 of an inch opening in front, 3-16 of an inch opening in back?

(2) What is the cause of increased lead in hooking up a Stephenson valve-gear?—H. F. W., Alberta, Saskatchewan

The position of the link when the main crank is on the dead centers should be carefully noted, and if the link retains its exact position when the engine is on either centers, the eccentric-crank may be assumed to be correct. Assuming that the engine is on the forward center in the forward gear, it will be noted that the valve must be drawn back half the amount of the difference between ⅛ of an inch and 7-32 of an inch, which is 5-64 of an inch. The variation between 9-16 of an inch and 3-16 of an inch as shown in the back motion being ⅛ of an inch, the half of which being 3-16 of an inch, it is necessary to find the average error in the openings, that is, the mean amount between 5-64 of an inch and 3-16 of an inch, which is 17-128 of an inch, or ⅛ of an inch, fully, which is the amount which the valve must be moved to equalize the valve-openings as nearly as possible

The alteration may be made on the valve-rod if possible, or on the eccentric-rod, but it will be noted that the connection between the eccentric-rod and the lower end of the link is much further removed from the center of the link than the radius-rod which acts directly upon the valve; hence the change, if made upon the eccentric-rod, will be, in an exact ratio to the distance from the center of the link, correspondingly greater

(2) The fact that the Stephenson link is held in place by two eccentrics having variable centers, when it is raised or lowered it

is not permitted to move in an arc having its center in the center of the axle, but is extended or drawn in according to the relative position of the eccentrics, and hence has the effect of moving the suspension-point and rocker-arm slightly out of its place to accommodate the deviation from the true arc.

HOW long a train would 120 box cars make?—W. L., Chicago.

4,320 feet.

A SAYS that the C. N. O. has more miles of track in operation than the I. R. C. Is A right?—J. G., Toronto, Canada.

If A refers to the Canadian Northern Ontario Railway, 465 miles long, he is wrong. The same applies to the Chicago, New Orleans and Texas Pacific Railway, which has 338 miles in operation. A is also wrong if he refers to the Intercolonial Railway of Canada, which has 1,468 miles of track in operation. Our interpretation of the characters leaves the whole matter in doubt.

WHAT is the average length of a box car?—R. J. T., Barnesdale, Ontario.

The length of a box car is 36 feet.

ARE there any railroads that teach men to become firemen by placing them at work with other firemen, instead of promoting cleaners from the engine-house?—H. L. H., St. John, New Brunswick.

There are no fixed rules on any railroads in regard to this matter. If you desire to secure employment as a fireman, make personal inquiry at the offices of master mechanics or superintendents in your vicinity.

ARE there any roads on which you can get a position as fireman or brakeman at the age of eighteen with your parents' consent?—F. M. S., Chicago.

See answer to H. L. H., St. John, New Brunswick.

HOW can an engineer take his train to division-point with the main tire slipped off on left side, and the right tires on the two forward drivers nearly off? The engine has four drivers on a side with pony truck.—F. J. B., Tacoma, Washington.

Block up the main driving axle on the side on which the tire has slipped off so that the wheel rim is clear of the track, and if the loose tire has not already stripped off the rods, remove them, blocking the steam-valve on the same side, and proceed very slowly with the right engine, observing that the other loosened tires are not also dropping by the wayside, in which further blocking could still make it possible to continue the slow running of the engine as long as one main driver remains intact.

O. S., Davenport, Washington.—The dimensions of steel rails weighing 56 pounds per yard are: width of base, 3¼ inches, width of tread, 2¼ inches, 66 pounds, base, 5 inches, tread, 2 13-32 inches; 85 pounds, base, 5 inches, tread, 2 9-16 inches; 90 pounds, base, 5⅜ inches, tread, 2⅝ inches; 100 pounds, base, 5½ inches, tread, 2 27-32 inches. The height of the rail generally corresponds to the width of the base, but in the Pennsylvania system the standard 100-pound rail is 5 inches in width of base and 5 11-16 inches in height. The other dimensions vary, but the average amount of material is about forty-two per cent in the head, twenty-one per cent in the web, and thirty-seven per cent in the base.

The expansion and contraction of rails is in a ratio to the degrees of heat. United States testing-machines show that the expansion per degree of heat amounts to .0000064716. Assuming that a steel rail is exactly 30 feet long at 40 degrees Fahrenheit, at 90 degrees it would have expanded .00032358 of its entire length, or 1165 inches.

In ascertaining the number of frog required on any line of lead, mark where it crosses the rail. Measure the distance in feet to where the line is 6 inches from the gage side of the rail. Multiply this by 2. The result will be the number of frog required.

F. P. B., Los Angeles, California.—The automatic headlight intended to follow the track when curving is still in the experimental stage. The results so far have not been particularly gratifying, but the rainbow is an illustration of what is possible if the necessary combination of elements can be assembled.

A. M. H., Johannesburg, South Africa.—American railway conductor and the British railway guard are identical in regard to their duties. They are in charge of the train, they receive orders from the station officials and transfer them to the enginemen and others. Conductors are in charge of all matters pertaining to the working of trains over double or single lines of railroad. They have also charge of baggage, mail, and freight. They issue and collect tickets, and while there are a variety of details, from the running of the locomotive to the work performed by porters, and with which the con-

ductor has little or nothing to do, his general duties are the same in America as in the British Empire.

In regard to the number of men employed on various kinds of trains, there is no general law applicable to every State in the American Union. An epitome of the Full-Crew Law recently passed by the Legislature of the State of New York was published in the July, 1913, issue of this magazine on page 343.

E. M., New York City.—It is said that the largest stone bridge in the world is the new one over the Susquehanna River at Rockville, Pennsylvania, on the Pennsylvania Railroad. Its length is 3,830 feet; width, 52 feet, 4 tracks, 48 arches, in all 440,000,000 pounds of stone.

KINDLY advise what is the best way to secure a position as brakeman, and what is the required age of applicant? —V. McL., Brooklyn.

Personal application at the operating department of any railroad. Application blanks and information are furnished on request. There is no exact rule as to age, much depending on the physical fitness of the applicant. Call at several of the offices near your home.

R. F. R., Irwin, Missouri.—J. Dietrich is master mechanic of the Chicago, Burlington and Quincy Railroad at Lincoln, Nebraska. Almost every type of locomotive known in American railroads are in operation on that road, the Prairie and Pacific types being much in evidence, but recently a number of powerful Mikado locomotives have been placed in service.

One hundred and thirty pounds would be considered light for a man to engage in general roundhouse work, but size is also considered, so that the light weight referred to would not be an obstacle to employment. The age limit and other particulars may be had on application at the master mechanic's office.

WHAT is the pay of a locomotive fireman on the through-freight service?

(2) How many locomotives has the Virginia Railroad?

(3) What railroad in this country hauls the greatest amount of coal?

(4) What is the yearly freight tonnage of the Virginia Railroad and number of miles of track in operation?—K. L. W., Bowling Green, Virginia.

By the agreement recently reached by the board of arbitration affecting the wages of firemen the following are the rates on the Eastern railroads, which nearly approximates that of the Western roads.

On locomotives less than 80,000 pounds	$2.75
80,000 to 100,000 pounds	2.85
100,000 to 140,000 pounds	3.00
140,000 to 160,000 pounds	3.10
170,000 to 200,000 pounds	3.20
200,000 to 250,000 pounds	3.30
250,000 to 300,000 pounds	3.55
All engines over 300,000 pounds on drivers	4.00
Mallet engines, regardless of weight on drivers	4.00

(2) One hundred and eight.

(3) The Pennsylvania Railroad.

(4) The number of tons moved on the Virginia Railroad for the year ending June 30, 1912, was 3,041,011 tons. There are 474 miles of track in operation.

O. N., Milltown, Washington.—There are a number of Pacific locomotives on the Great Northern Railway, of which No. 1402, built by the Baldwin Locomotive Company, is an excellent illustration. This locomotive has a maximum tractive-power of 30,190 pounds. Its engine weighs 217,000 pounds; tender, 142,000 pounds. The cylinders are 21 by 28 inches. The working-pressure is 210 pounds. The length over all is 71 feet 2 inches, height of stack above the rail is 15 feet 1 inch; width, 10 feet 4 inches.

The Mallets are rapidly superseding the Centipede type of locomotive, but a few are still in mountain service.

F. G. B., San Antonio, Texas.—The Alaska Northern Railway will extend from Seward to a point near Fairbanks, 450 miles. Seventy-one miles were in operation last year. About 50 miles are partly constructed. Another division 300 miles long is proposed. The gage is 4 feet 8½ inches. There are 4 locomotives and 37 cars of various kinds.

The Copper River and Northwestern Railway has 196 miles in operation. There are 15 locomotives and 146 cars, also 5 river steamers.

Council River and Solomon River Railroad has about 100 miles completed. There are 3 locomotives and 19 cars.

Tanana Valley Railroad has 45 miles in operation, extending from Ohena to Chatinika, Alaska. This is a 3-foot-gage railroad with 4 locomotives in service and 31 cars. It may be added that a special Federal commission reported on the Alaskan railways last January and extensive additions are proposed looking to important developments which, of course, will take a number of years

to complete. The prospects are most encouraging.

ARE the freight-cars of the Grand Trunk wider than those on other lines?

(2) Who is the president of the Canadian Pacific Railway?

(3) What is the distance traversed by the Twentieth Century Limited between New York and Chicago?

(4) How many stops does this train make at stations?— R. E. S., Providence, Rhode Island

No.

(2) Sir Thomas G. Shaughnessy, Montreal, Quebec.

(3) 956 miles.

(4) Seven at least.

C. P. L., Springfield, Long Island.—The French experimental locomotive purchased a number of years ago by the Pennsylvania Railroad was tested at the company's testing plant at Altoona. It was known as the De Glehn type. Its success was not particularly marked, and it has given place to locomotives of a more powerful and more economical type. A very full report of the result of the tests was published, and a copy may be procured on application to the company.

(2) Switches are of three styles, stub, split, and special or patented. The third style comprises special patented modifications or improvements of the first and second. The principal objection to the stub switch is that the binding of the ends of the rails at the head block by the passing wheels causes the rails to bind at the head block when expansion becomes great, causing the derailment of trains. The split switch is the same in principal as the old English point switch used in England since 1830. The improvements made by different makers are intended to take up the wear of the switch-points and so preserve the gage and also reduce the danger of the flanges of wheels running between the rail and switch-point. This has been effected, in part, by a modification of the bridle-rods. In the transit split switch only one bridle-rod is used. It is alongside the tie, hence it is not in the way when ties are tamped or when there is ice and snow.

The Lorenz safety split switch has a heavy spring attached to a bridle-rod at the point of the switch. This is strong enough to cause positive motion of the points, yet it permits a car to pass through when run from a siding into the switch, the spring then throwing the points back again to their proper position. Switches of special design are generally intended to give a continuous rail for the main line. There are various styles and makes, including the MacPherson improved safety, the Wharton switch, the Dugan switch, etc.

(3) "Per-diem" rules, so called, are rules that govern the rate of wages or other exchanges for each day. There is no book published on this subject, the per-diem rules being usually attached to other publications of a more general kind.

(4) Large additions are continually being made to the Pennsylvania Railroad, particulars in regard to which may be had from Mr. Alexander C. Shand, chief engineer, Philadelphia.

N. T. O., Sandusky, Ohio.—When locomotives were first built the public roads were, for the greater part, crossed at grade, and the engine-driver had no way of giving warning of his approach except by blowing a tin horn; but this was far from being a sufficient warning. One day, in the year 1833, a farmer of Thornton was crossing the railroad track at one of the country roads with a load of eggs and butter. Just as he came upon the track a train approached.

The engine man blew his tin horn lustily, but the farmer did not hear it. Eighty dozen of eggs and fifty pounds of butter were mixed up and the wagon was reduced to kindling.

The railway company had to pay the farmer the value of his butter, eggs, horse, and wagon.

It was regarded as a very serious matter, and straightway a director of the company went to Atton Grange, where George Stephenson lived, to see if he could not invent something that would give a warning more likely to be heard. Stephenson went to work, and the next day had a contrivance which, when attached to the engine boiler, and the steam turned on, gave out a shrill, discordant sound. The railway directors, greatly delighted, ordered similar contrivances to be attached to all the locomotives, and from that day to this the voice of the locomotive whistle has never been silent.

S. B. B., Washoe, Nevada.—The driving-power of the Imperator machinery aggregates 62,000 horse-power ahead and 35,000 horse-power astern. The "ahead" turbines are four in number; a high and an intermediate-pressure unit on the two inner shafts, and two low-pressure turbines, each weighing about 380 tons and developing about 16,000 horse-power on the two outer shafts. The astern turbines consist of two high and two low-pressure units on the inner and outer shafts respectively. Each separate shaft is available for running. The propellers are 16 feet 5 inches in diameter and revolve at 185 r.p.m. at a ship speed of 22.5 knots. The total turbine installation has 760,000 bronze

blades. The drums of the low-pressure turbines are 11 feet 10 inches in diameter and 17 feet in length and carry 50,000 blades.

GEORGE BELL, Ontario, Canada.—Since July 1 both ordinary and parcel post stamps may be used for postage for all classes of United States mail matter.

There have been many complaints because of the ruling that parcel-post matter must bear the distinctive parcel post postage, and that ordinary stamps cannot be used for the transmission of ordinary mail matter.

It is also indicated that the printing of parcel-post stamps of a distinctive design will be done away with, but until the present supply is exhausted these stamps may be used on both parcel-post and ordinary mail matter of the first, second, or third class.

CORRECT INFORMATION!

THE NEWSPAPER REPORTS.

PRINCETON JUNCTION, New Jersey, March 2.—By the narrowest of margins the Pennsylvania night limited from New York to Washington, while running at seventy miles an hour, to-night escaped crashing into a freight wreck just below here. The presence of mind displayed by John Schrenk, a flagman, and by the limited's engineer, aided materially in averting disaster.

The freight train was running at a good speed when, with a jar that threw Schrenk from the cupola of the caboose, the long string of cars broke in the middle and the head car was thrown across the outside track, used by southbound passenger traffic.

From his seat in the cupola Schrenk had seen the headlight of the limited hardly a mile in the rear coming on at full speed on the outside track. As he staggered to his feet, half stunned, instinct told him that whatever had happened it was almost certain to have affected the path of the oncoming limited. He thereupon ran down the track toward the approaching express, which was loaded with passengers bound for the inauguration.

Schrenk had signal torpedoes in his pocket. After running a hundred yards he planted one on the rail and then rushed on. Finally he stopped in the center of the track and waved his arms in the hope that the engineer of the express would see him in the glare of the headlight. He had no time to plant a second torpedo before he had to leap aside.

The engineer of the limited was driving at top speed, with no stop scheduled before North Philadelphia. He did not see the flagman, nor was he supposed to stop on the signal of one torpedo, which ordinarily means to slow down. But the engineer had a "hunch," and that one torpedo was enough. He shut down the brakes hard and halted his train a bare one hundred feet from the freight car across his track.

THE CORRECT REPORT.

THE facts in this case are that a car was wrecked, blocking the westbound passenger track. The flagman flagged train No. 91 to prevent that train from running into the wreck. The name of this flagman is Rufus K. Clark. He was not thrown from gig top of the cabin car, but when train stopped, noticing it was somewhat sudden, he immediately descended from the cabin car with his lamps, and looking up the tracks saw men with torches on No. 4 track, from which he concluded something was blocking No. 4, and immediately went back to flag approaching trains.

At the time he started back there was nothing in sight, and he proceeded about the distance of one city block from his train before the headlight of the engine of train No. 91 appeared. He had a red and white lamp with him, and thinking the engineer was a little slow in seeing his signal to stop, he capped the rail. This flagman states that at least two or three minutes passed from the time he first started back to flag until he saw train No. 91 approaching.

In taking this matter up with the engineer he states he saw the red lamp some time before running over the torpedoes; that he was probably three or four hundred yards distant from the flagman when he saw him wave the lamp; that his speed was reduced when he passed the flagman, and shortly after passing him the torpedoes were struck and train stopped. At the time the train was stopped he was about five car lengths from the car that blocked No. 4 track.—*J. B. Fisher, superintendent, New York Division, Pennsylvania Railroad.*

A Son of Pepetshu.

BY GEORGE VAN SCHAICK.

A Giant of the North Places a Human Burden in His Tump-Line and Starts over the Lonesome Trail.

THIS is the tale told me, many miles up the great Mistassini River, by Pepetshu, the Lynx, whose baptismal name is Peter. Despite his many years he is strong yet, though much hunched in the back from bearing great burdens, and one of his feet has no toes, as may be known by his gait.

My other guide was his son Simeon, a middle-aged giant of few words, who had just put down the canoe and gone back over the portage for the rest of our duffel.

"He will bring it all in one trip," said the old Indian to me, "for the load is short of three hundred pounds."

I nodded, knowing something of Simeon's prowess.

"God," said Peter, speaking slowly in the French of the missionaries, "has chosen to make me the father of a man greater than I ever was, and stronger."

He swung his hand vaguely toward the millions of square miles of land barren with rocky woodland and unending marsh extending to Jim Bay, as he called the lower end of Hudson Bay, and farther on beyond the arctic circle.

"It is there," he said, "that Simeon showed that he was a man, and, *monsieur*, in three days you shall see the place."

He lit a match with the studied care of one who knows that on such a tiny bit of wood his life may some day depend, and puffed at his black pipe; but my eyes rested insistently upon him, so that he knew that I expected more.

"It was a terrible year of no *uapush*," he began. "The great evil had come upon the hares, and the snares remained empty day after day. Nor did we then, as now, take great loads of flour with us and very few had sheet-iron stoves.

"The snows came so often and so heavily that traps were ever covered by them as soon as they were baited and set. That year, at the coming of warm weather, there were whole families that never returned to Pointe Bleue. Some of their bones were found in the following Month of Falling Leaves, so that many hunting-grounds passed into new hands. I had gone north with only my son that year, for his mother had just been buried by the Oblate fathers, and I paid for many masses.

"The longing for one whom a man shall never see again had come upon me and thrown a weakness on my limbs. Yet I sought to do my utmost, for I was but fifty then and not so bent as now.

"It was the worst year for trapping that was ever known among us. Some there were among the Montagnais and Nascaupees who had never been baptized, who said that the evil god, Matshi Manitou, had finally prevailed against Tshishe Manitou, the one that is good, and that the Windegos, the bad spirits, had been let loose upon the world.

"It is sure that, to my son and me, came days of hunger when all our food was gone and all our hunting brought but greater weariness. All of the bad chance that may befall men came to us. One cache was robbed by bears just before their time of going into winter holes and another torn to pieces and fouled by wolverines. Moreover, our

tent took fire and burned down, and our blankets with it.

"After much thinking, I spoke one day to my son.

"'Over the snow of the woods and the ice of the rivers,' I said. 'It is a journey of full fifteen days to Pointe Bleue. If we stay here, we must surely die. If we go back, I shall doubtless die also, but nearer to where thy mother is buried, and thou, being young and of much strength, mayest perhaps reach home. Also it may be that the luck that has been so bad here may change on the way.'

"Simeon, therefore, made his pack and mine also; but his was heavier. We started, and when night came he set snares, and in the morning he had caught one hare and we had food. Later we ate the skin.

"Then passed nearly a week, during which we had but two of the red-eyed black partridges, that are fools, and one very small porcupine. In the night I considered the distance we had traveled and I thought of the weakness that had come upon my limbs, reckoning that if no food came I might go two days more before falling not to rise again.

"I was glad I had made it this much easier for the meeting of my soul with the other I hungered for. Moreover, we might still find food to eat.

"But on the next night, not having eaten at all, I wondered whether I could last another day; yet in the morning I found that I could still force my legs to move. When I looked at Simeon I saw that he was the stronger by far, though the food had been divided equally.

"'I shall not walk much farther,' I told him in the afternoon, 'because now I begin to stumble. Leave me now and hasten on, because by this time I am hindering thee greatly. I shall follow in thy trail. When I can no longer crawl on hands and knees I shall blaze a tree, so that perchance thou mayest some day find my bones and bury them. I have no fear, for sleep comes very easily.'

"Then he looked at me.

"'Am I as big a man as thou?' he asked.

"'Yes, and bigger,' I answered.

"'Then I shall take no orders from thee!' he said, 'but will obey my own will and stay with thee to the end.'

"When I would have spoken he did not listen, and in my heart I was proud that he was the bigger man and stronger.

"The pain in our bellies passed off during that night after he had lighted two great fires between which we crouched. I knew then that the end was near, for when a man ceases to suffer he is near death.

"'Thou canst not travel farther?' he asked me.

"'This is the place of my last camp,' I told him. 'It is good, for there is a great ledge of rocks here, with hollow places where thou canst find me again.'

"I saw then that his belief was the same as mine, for he took my snow-shoes, seeing that I could no longer walk. Besides the hunger, I had frozen the toes of my left foot. Then he cut out the *babiche* from the snow-shoes, cut the strings in small pieces, and boiled them in our kettle, and we drank the water and chewed the tough bits and swallowed them—after which came sleep.

"In the morning I awoke him, telling him that the day was coming and it was time for him to rise and begone, and that we should say good-by. But he spoke not a word. He lighted the fire again and made a cache for things in both our packs. Then he took his gun and went, not looking at me, and I thought it was better so.

"Yet he was not going in the proper direction, and I heard the call of a raven, which is counted an evil sign.

"I was beginning to fall asleep when I heard the report of his gun. He soon returned with Kakatshu the raven. I would not eat of it at first, knowing it might do little good in keeping up my life for a day, whereas it would help Simeon greatly, who was stronger.

"Then he spoke angrily, threatening to lie down with me and die unless I ate of the raven. He boiled it and we drank the water and ate every bit and crunched the bones in our teeth like dogs, leaving but the claws and the long black beak.

"Then Simeon took his tump-line.

"'If I am not too weak to lift thee from the ground we shall go on,' he said.

"He paid no more heed to my refusals than if I, his father, had been a child. He knelt and pulled me on his back. The

tump-strap was over his forehead, while the line ran under my thighs. He lifted me, though his long legs were trembling; but when he had straightened out he walked even faster than when I had followed him

"Until the middle of the day he walked, never resting for the fear that was upon him lest he should not be able to lift me on his back again. The breath was coming from his chest like that of a moose that gasps with a bullet in his lungs

"'For the love of the saints,' I said to him, 'stop now. Here is a great tree with big-roots. Place me between those two that I may sleep in peace, and go on with the blessing of God and mine.'

"But he refused. Presently his foot struck a hidden stone in the soft snow and he fell with the weight of me on his back. Looking at him, I judged that he was dead, and some gladness came to me, because of my weakness, that we should die together.

"Yet so wonderfully was the life of him fastened with clenched nails in his body that he began to gasp again with the foolish look of one whose soul has wandered away for a time and returned. Then he wiped away the blood that ran into one eye from a cut on his forehead and built a fire, and we drank hot water, after which we knelt together for a prayer that was sorely needed.

"I thought that by this time he would leave me in the peace I longed for, but his big teeth came together and he looked like Maigan the wolf snarling in a trap at the very face of death. And I, *monsieur*, am the father of that man!"

The old fellow stopped for a moment, and the look of pride upon his face did me good to see.

"Our prayer was so answered that he had strength to lift me again to his big back, and he went on, while great trees were bursting with the frost, cracking like guns, and the ice on the river groaned with the struggling of the shut-in flood.

"I am one who knows that to lie is to sin, and I tell you that for two hours he continued to stagger. Then we came upon the fresh track of a moose. Simeon stopped for a moment

"'I cannot,' he said 'and thou wouldst be dead before I could return'

"So he went on, and the weight of me upon him must have grown into the weight of a mountain. But he kept on, beginning to stumble again. Then it was that to both of us came the smell of wood-smoke. The power of his legs returned as we saw a tent. A young woman was looking. But when Simeon reached her he sank to the ground with me, falling upon his face.

"Dieudonné and Joseph of our tribe, with three women and six children, were camped there for the day, also fighting to reach home again. The girl who had first seen us was Anne, the sister of Dieudonné. They dragged us in their tent, where they had a small stove, and chafed some of the frost from our faces and limbs; but my toes remained in the end of my left moccasin.

"Simeon breathed again after a time. The young woman brought out the hind leg of a beaver and made soup and fed us slowly. The tale of these people was also one of misery and hunger, but we fell asleep as they were speaking.

"On the next morning we were awakened by the crying of the little children.

"'They are very hungry,' I said.

"'The meat of yesterday was our last!' said Marie, who was the woman of Joseph.

"The two men and my son and I began to talk over this matter when Anne entered. In her hand was a hare that she had found in her snares.

"'It is the first in many days,' she said, 'and it is very small and thin. Also the moose which left tracks yesterday has come back and gone south. He has big feet.'

"The two men, Joseph and Dieudonné, were fine trappers; but they knew that with a gun Simeon could beat them.

"'The snow is soft and good for tracking,' said Joseph, 'and a man who was strong and well fed might, with the help of God, run him down and kill him. Let Simeon eat the hare!'

"Therefore Simeon ate nearly all of the hare, hiding himself in the bushes, for the cries of the children shamed him and every mouthful hurt him in his heart; but it was the only chance.

"After he had taken his gun and left, the little ones had soup from the bones

and the skin, and we waited all that day, but nothing came and the night was again very sad with the crying of the children. The smallest seemed to be dying.

"At sunrise Anne went out, but found nothing in her snares, and the men started with their guns, coming in before dusk with empty hands. My heart was sore with fear that Simeon might be dead, but when the first star arose, he came. On his shoulder he bore the hind quarter of a moose, which, in the days of my strength, I never could have carried far And this was the manner of our saving

"He had followed the tracks all the day before. He slept on them and hunted again until after the middle of the day, when he ran him down and killed him

"Then he had eaten meat that quivered and packed meat on his shoulder and hastened back many miles.

"On the night before this we had prayed much, of course. But this one was the night of the arrival of the Man God upon earth, in the manger, between the ass and the cow. After we had eaten, Anne brought out a small end of a candle that she had saved and lighted it in the darkness, and we all knelt in the tent, except the babe that was at Marie's breast, which now slept after the drinking of strong broth.

"We repeated the prayers and sang the hymn of Christ new-risen, and the words were heard, for we stopped but two days until all the meat had been brought into camp and we were strong again—and in another week we were all at Pointe Bleue.

"Our dogs, of course, had long before been killed and eaten, and we brought no fur and were deep in debt; but we gave thanks for our lives in the little church at the foot of the side-hill. In the spring Anne married my son Simeon, than whom there is no greater man between here and the ends of the earth"

The old fellow stopped and scraped out his pipe, filling it again from my pouch; and I listened to the roar of the great falls that seemed to sing a grand hymn to a magnificent world.

Then Simeon came back. I could not help staring at the silent, good-natured giant who was bending beneath a load I could scarcely have lifted from the ground.

The old man also looked at him worshipfully.

Under the big chap's dusky skin the blood seemed to rise, and he turned bashfully, like a child.

"The father," he said, "is a good old man, but he likes to speak of foolish things."

Then he filled his pipe and sat on our log and put a huge hand on the old man's shoulder and they smiled at one another. I rested beside these men in silence and considered their greatness.

THE "9.30 EVENING P. M. FREIGHT."

SHIKARO TAKOMOTO, "Japanese Passenger," has written to the Hon. S. Pacific Company, voicing in earnest but courteous manner, some grievances and suggestions. The letter reads as follows:

"Dear Hon. S. Pacific: I residing in these Suisun City and question, please do engineer 9.30 evening P. M. freight train necessary blow whistle with so long lasting of sounds for calling back end brake man if 5 short whistle call would wake my baby and back end brake-man with same effect each departure? Many other trains at crossings raise same long night noises, cannot all lives be safe with less awaking of almost the dead? Also recent time of late I travel with hon. employ in lovely electric lights Pullman car 'Aliena' and cannot find satisfy place to lose my watch and American eagle ($10.00) for complete safety. Could not hon. Pullman save 25c from every gentleman in lower berth rate financial condition by inserting in smoke room wash place, one smalle deposit box convenience (10c to porter upon arrival at destination to leave key with it), so saving temptation of robbery under pillow? Thanking you for quiet relief to home and very grateful for travel safely. Yours truly, Shikaro Takomoto, Japanese Passenger."

The Southern Pacific, says the *Railway and Engineering Review*, has answered Takomoto and assured him that it will do all it can that "all lives be safe with less awaking of almost the dead" and also "for quiet relief to home."

THE FREIGHT-CAR LESSON.

BY W. H. SHAFER.

FROM coast to coast they travel their beat,
From Canada's frost to gulf-line heat—
'Tis the freight-car riding the shiny rail—
Just listen a while till they tell their tale:

The first car to come was a Boston and Maine,
Loaded with sirup from old Champlaine.

A Central Vermont was next to that,
Followed close by a Rutland flat.

An N. P box was swinging fine,
Loaded with copper from a big Butte mine

A New York Central tried to beat them all,
But got switched off at Aspinwall

A C, I and L. was coming late,
Loaded with stone from the Hoosier State

An Illinois Central, carrying beans,
Was going south to New Orleans.

A B. and O. since days of yore,
Was moving slow toward Baltimore.

A Texas Pacific quite well up to date,
Had a shipment of cattle from the Lone Star State

A Seaboard Air Line skipped by the way,
Loaded with resin from Savannah, Ga.

A Mexican Central was evading the law,
Bringing guns into Chihuahua.

An Erie box was hitting the trail,
Speeding west with periodical mail

The Canadian Pacific was running a flat
From old Montreal to Medicine Hat.

A Puget Sound, with truck from Bettendorf,
Had a cargo of tea from Tacoma Wharf.

An L. and N went by with whoops,
Traveling north with cantaloups.

The P. and R had a hundred light,
Going to the mines for anthracite.

A B. R. and P., going far from home,
Had mining machinery *en route* to Nome.

A Q., M. and S that's never lax,
Had a cargo of fish from old Halifax.

An O., W. R. mushed by with some load
Bound *via* of Seattle for the White Pass Road

Out of Pine Tree State came a B and A.,
With a cargo of paper marked "Don't Delay!"

A Salt Lake Line tried to make a stand,
But fizzled out on the D. and R. Grande

A C. and E. I. coal-flat, loaded with coal,
Started to balk at the tunnel hole.

A C, H and D from that line of renown,
Had a car load of registers from Dayton town.

A Wabash flat, with a westerly trend,
Had harvesting machinery from New South Bend

A J. I. Case flat from old Racine
Was beating it West with a thrashing-machine.

A L. S and M. S. car, though somewhat down,
Had imported goods from Harlem town.

A Frisco car was forging ahead,
Groaning under a load of white lead.

A Grand Trunk Pacific was slinging sass,
Carrying supplies for Yellow Head Pass.

An A. R. L., crammed full of pork,
Was going fast to old New York.

A P. M. box was making things crack,
Loaded with autos from Cadillac

A C. and A. figured rather slim,
When the others all cried, you're butting in

A K., C. M. and O. was moving slow,
Bringing sulfur from Mexico.

A C., G. W. hurried by with a grin,
Bound for St. Paul with a load of tin.

A Big Four box, rather hard to miss,
Had a cargo of goods for Indianapolis.

A Rock Island box was rolling slow,
Loaded with boes for El Paso.

A D. and I. R. was running hot,
With iron ore from Proctor Knott.

A U. T. L. shot by with a scream,
Headed for Chi. with gasoline

A Central of Georgia was off the main,
Bound for a mill with sugar-cane

A Union Pacific ducked by with a frown,
Having come all the way from Frisco town.

A U. R. T., loaded heavy with beer,
Sailed by with a smile and a nod of good cheer

A Colorado Southern was trying to hide
A load of coal from Telluride

A Central of Jersey went by with a groan,
Making a noise like a graphophone.

A C., M. and St. Paul, that's never late,
Had a cargo of spuds from the Badger State

A Michigan Central was going through
With breakfast food from Kalamazoo.

The A. B. and A., with sullen roar,
Was hauling steel to the Key West shore

A Soo Line went by at noon,
Loaded with plows for Saskatoon

An M., K. and T. had a lot to say,
But got mixed up with the Santa Fe

From the Gopher State came an M. and St. L.,
Not beating them all, but doing well

An E., J. and E. was making a bet
It would head in first at Joliet.

A C., B. and Q. was skirting the hills,
Loaded with flour from Minneapolis mills.

A Canadian Northern was doing its best,
Hauling grain from the great Northwest

An N. Y., N. H. and H. was making 'em snort,
Loaded with clocks from old Bridgeport.

A big M. and O. said, "Get out of my way,
I'm carrying bananas from Mobile Bay."

A C., L. S. and E., though somewhat wary,
Had a shipment of rails from the mills of Gary

A Southern Pacific was rolling just so,
Loaded with scouts for the Alamo

A D., L. and W., whose stocks are high,
Was earning the coin, but couldn't say why

A Missouri Pacific was doing fine,
Hauling corn from the Texas line

A P. R. R. was making 'em squeal,
Way-billed Scranton and loaded with steel

From the Bear State came an F., G. E.,
Hauling fruit from Santa B.

A C. and O., without any frills,
Was mooching over the Cumberland Hills

An A. C. L. came last, but not least—
It's the busy line in the new Southeast

Across valleys and rivers, through mountains and woods,
They are trying their best to deliver the goods;
'Tis the way of the freight-car, may they ever run,
O'er the rails of our land from sun to sun.

The Run For the Rotary.

BY EDGAR FRANKLIN.

"Absolutely a New Principle, Mr. Welling! It Is the Most Wonderful Thing—the Most Wonderful Innovation."

A NOVEL COMPLETE IN THIS ISSUE.

CHAPTER I.

With the Buyer Picked.

T the far end of the small, tool-littered loft the whirling chunk of brass in the lathe shrieked through the twilight under the hand of the sober-looking young man—shrieked again and shrieked no more, for the sober-looking one had cut off the motor and was sighing meditatively over the little detail job.

It was a neat little job, as perfectly done as every other mechanical thing that Henry Darling attempted; yet no particular satisfaction seemed to have come with its completion. Darling's grave eyes rested on it very absently—and the door of the loft opened with a snap and closed with a bang, and a very crisp voice demanded:

"Why don't you turn on the light, Henry, if you're working at that lathe?"

By way of setting the example, five big incandescents were whisked into being, and Darling turned to survey Robert Mace, his partner these last two years in the risky business of inventing new things.

Partners frequently furnish contrast; there was plenty of it here. Darling, for example, long and lank and dubious of expression, wore no collar; the shirt and trousers behind the long, grimy apron would never have branded him a fop; and even Darling, this last month or so had been hanging the coat and hat that went with them in a charitably shadowy corner of the shop against the chance of a visitor.

Mr. Mace, on the other hand, boasting about the same twenty-eight years of life, rather shorter and more muscular than Darling, might have stepped from a book of summer styles. His linen, carefully cherished, was of the newest; the unusual mixture of his blue suit was individual, assertive, and expensive; and his smile, the one detail which had involved no expenditure, held that calm, slightly chilly, assured quality that goes with the possession of millions.

Viewing which, it is painful to contemplate Darling's answer:

"How much was that electric bill?"

"Twenty-eight dollars and some odd cents."

"Paid yet?"

"No, Henry," said Mace very mildly.

"That's why I'm not using a light over here," sighed Darling. "Turn off two or three of those, Bob."

"Nix!" said the more ornamental partner as he dropped into the one armchair and poked through an ocean of brass and steel scraps on the table until his corn-cob pipe finally came into view. "This bright, happy nature of mine won't stand gloom."

"No?" Darling smiled rather bitterly. "How much is left, Bob?"

"Money?"

"Yes."

"Thirty-two dollars and sixty cents, Henry," Mace said cheerfully, and lit a match for his odorous treasure. "Now don't clasp your hands, Henry, and gasp like that. I've been ducking this discussion of money ever since you turned pale at finding out that we were down to the last hundred. Anyway, it's immaterial!" He dismissed the whole subject with a wave and smiled contentedly through the smoke. "Welling declines to see any one about new business of any sort for months at least. I've pulled a dozen wires, and they all bring the same result: he won't be interviewed by any one, anywhere, about anything new."

The collarless partner swallowed audibly.

"Why do we have to sell to Welling, Bob? There are other—"

"—engine people. I know it. We don't want 'em!" Mace finished briskly.

"Henry, you and I, with our combined, almost incredible mechanical genious, have put together the one rotary engine that the world has been waiting for. We've caught a new mechanical principle, practically, and made it work—and we've gone down to our last cent doing it, which cuts no figure whatever.

"We could go to any one of a dozen engine manufacturers and, after the Lord knows how much delay, start manufacturing on some sort of royalty basis. Good! Meanwhile, we have two other things to work out—either of them as valuable even as this, both of them needing thousands and thousands of dollars in real money before we can develop them. Meanwhile, also, Henry, we have to *eat!*"

"I know, but " Darling began helplessly.

"Whereas, Welling is positively the *one* out and out promoter with sufficiently big capital of his own to buy us out, outright, on his own hook—and he's straight."

"But if you can't get to him—"

The dapper mechanical genius walked to the far side and turned on a new light before opening the closet, and at the prospect beyond the door even Mace sighed.

"I'm—planning to see Welling, Henry," he said absently; and then, with more animation and some real indignation: "Did you finish up all that tongue for lunch?"

There are plenty of rolling hills in lower Westchester County—gentle inclines for the most part, that offer no suggestion of trouble to the modern automobile. Yet up one of the mildest this bright, early morning the big green car panted and choked and struggled as if the rise had been a degree or two more formidable than that of Pike's Peak.

She made the top and nothing more, and there the sharp-featured, iron-gray man at the wheel jammed down the emergency brake and stepped out. Of the two girls in the back of the car the very pretty dark one roused from a momental reverie and smiled vaguely; but the light haired young woman, who bore a strong resemblance to the man, leaned forward and asked:

"Whatever happened, dad?"

One exasperated second the iron gray man glanced at her.

"At a rough guess, Alice," he said, "the whole engine fell to pieces coming up that hill! She was hitting on only three when we started up, and then on two—and it is my strong impression that that last dozen gasps all came from the one cylinder. Well—"

He ended with a grunt and raised the bonnet, and after two or three minutes of apparently fruitless grunting had come from its depths the pretty girl asked:

"Is there time to get out and walk around? It's lovely up here!"

The iron-gray man straightened up.

"I imagine you'll have time for a ten-mile stroll, Dorothy!" he snapped acidly. "I can't see what ails the thing. I may have to take it down and—"

"It was all right five minutes ago," the light girl suggested helpfully. "It began to—look out, Dot! Let that fellow by before you get out!"

The last being apropos of the dust-cloud coming up the hill behind them. It was a considerable cloud and a noisy one; at its apex a long yellow car of the road-racing type whizzed toward them, cut-out wide open, big wheels bowling along as if the thing had taken to running away on a down-grade.

Behind the huge, low steering-wheel a

well-favored young man in tight-buttoned linen duster and little leather cap drove placidly, and then, at the sight of the big green car, started slightly—squinted at the iron-gray man—finally reached down to his control levers and, with a graceful swirl that just skimmed the far side of the road, came to a standstill beside the stalled car. The well-favored young man leaning out, inquired:

"Trouble?"

"Seems so," the iron-gray man muttered

"Want any help?"

"If you're mechanic enough to tell me just what ails this thing it will be much appreciated," the elder man said, with a faint, grudging smile.

One agile bound and the driver of the yellow car was out and at his side. One brief moment he glanced at the two girls in the rear and started slightly and flushed a little as his eyes rested on the darker girl; then, humming, the individual of the road-racer was bending over the dead engine, patting it here, bending to look there, poking at the carbureter.

He ended by stepping briskly to the front and, self-starter ignored, spinning the engine in a fashion that argued well for his muscles, he nodded to himself and demanded:

"Spark plugs all right?"

"All four new yesterday," the iron-gray man answered.

"Ignition been kicking up before?"

"I've had this car two years, young man, and this is the first time it has done anything of this kind."

Humming again, the younger man bent over the engine once more and fumbled further.

"It's your wiring!" he announced flatly.

"I don't think—"

"Look!" He of the yellow car smiled a trifle and reached down for a rubber-insulated stretch; he felt along it for a second or two and he grinned broadly at the limply bending spot that appeared. "Happens, you know, when you least expect it—careless handling in your garage—poor wire—something of the sort. Shall I tinker it for you?"

"Well—"

"Oh, I carry all that sort of thing." The younger man laughed blithely as he stepped to his tool-box and threw back the lid. "If you'll just loosen up those connections while I get this stuff ready to use."

A coil of heavy wire, a pair of side-cutting pincers whisked into view—and the animated young man had shed duster and coat and, sleeves rolled up, was busy in a matter of seconds. He worked with hands of amazing deftness, too; and the pretty girl took to watching him with lively interest—and then looked away quite abruptly at his sudden underbreath exclamation. There was a reason for that exclamation and the dot of blood on his forefinger. The young man, scraping away a length of insulation, so far from watching his work, had been looking toward the extremely pretty girl.

But he speeded up now, with all his attention on the wire, and with a handful of wiggling ends he turned to the green car—brushed the elder man gently aside and, humming still, went about rewiring the ignition.

Stray bits of wire, cut loose, were tossed over the fence, new pieces inserted with an accuracy as to the proper connections that was no less than amazing, and at last the young man stood erect and smiled confidently.

"Now if you'll just try the starting mechanism, please?"

The iron-gray man obeyed silently; ten seconds, perhaps, and the engine of the green car was purring smoothly as ever man-made engine ran! And the owner of the car turned, with genuine admiration in his eyes, to say:

"Well, I'm more than obliged to you, sir! You're certainly a mechanic!"

"My business," the younger man smiled.

"That engine of mine—"

"It's a good enough engine, as they go," the other said crisply. "The best of 'em this present form of engine, I mean—are a mass of faults. They'll be on the junk-heap in another ten years—gas and steam types together."

The iron-gray man stared frankly.

"That's rather an assured prediction."

"It's justified, though," grinned the gentleman of the roadster as he slipped into his ulster. "We're ready to offer the world an engine now that'll put these things"—he indicated both engines with

a wave—"straight into the class with the pyramids, sir. Well, good morning!"

He glanced at the controls on his steering wheel and prepared to step into the big yellow affair; he hesitated a moment, and it was with a decidedly enigmatic expression that he turned to find the older man at his elbow, candidly interested. The expression changed back to the grin, though, at:

"Pardon me, but are you quite serious?"

"Serious?" Astonishment faded the grin. "Of course!"

"You are interested in a radically new type of engine?"

"Absolutely!" The younger man smiled blandly. "We invented it and own it."

"We?" The other smiled pointedly.

The man of the yellow roadster felt in his vest-pocket and offered a card, and the iron-gray individual studied it and shook his head.

"Robert Mace — Mace and Darling, eh?" he muttered. "I know a good many mechanical engineers, but—"

"But you never heard of us?" Mace laughed richly. "We haven't been courting publicity while we were getting this thing ready to spring that's true."

He stepped into the car and settled comfortably, and the elder man looked him over keenly for a moment before:

"Is this thing on the market?"

"Not yet. We're looking for just the right firm, or man for that matter. We expect to sell outright and we are in no particular hurry."

"Indeed!" The iron-gray man found a card of his own and proffered it. "I am more or less interested in that sort of thing, Mr. Mace."

Robert Mace's frowning interest settled on the bit of pasteboard; he seemed trying hard to place the name it exhibited; the eyes he raised a moment later were clouded with thought, and he said, with a refinement of art:

"Welling – Welling? I'm sure that name is—er—familiar, sir, and yet I cannot quite place it."

"It'll be mighty familiar to you before you've peddled your engine very far," the elder man said dryly. "I'm rather well known among people with big mechanical things that need financing." He rested a foot on the running-board of the car. "Just what is the principle of your machine, Mr. Mace?"

Mace positively stiffened.

"My dear sir," he said coolly, "I'm sorry, but this is nothing that can be gone into at a roadside chat. There are so many minor principles involved—"

"All right. Come and see me, then," smiled Welling "You would have tried to get to me sooner or later, probably without success." His foot came down and he looked at Mace squarely. "If you're at liberty this afternoon drop in at my office at—well, three?"

"Even in view of the fact that we mean to sell outright and for every penny the engine is worth?" Mace asked evenly.

"Because of it, perhaps." Welling smiled briefly. "Dorothy!"

The very pretty girl looked up quickly.

"The gentleman who pulled us out of the hole is Mr. Robert Mace," said the iron-gray man. "If he calls at the office this afternoon I will see him at once; do not forget."

He nodded at Mace and at the girl, who dimpled for a moment and bowed assent; he mumbled introductions of a tangled and belated sort, in which Mace caught "daughter," which evidently related to the light-haired girl, and "Miss March," the latter being the darker one, it seemed.

And then Mr. John Welling, stepping into his own car, spoke across the road:

"Time we turned around! I'll look for you, Mr. Mace!"

He backed about and took the road again, with a final nod; the girls were bowing a farewell, too, and Mace removed his cap and smiled—and then they were spinning back down the hill and the coinventor of the coming rotary engine stared after the green car with an expression that was all enthusiasm and expectation.

He was sitting there, staring still, when the larger machine whirled out of sight around a turn, quarter of a mile away, and the eyes that drifted to the mighty steering-wheel fairly glowed. The glow, of course, was one of plain joy over the prospect of an interview with Welling, actually requested by that gentleman; yet the comment he made was rather odd, for all that Robert Mace

confided to his steering-wheel was a low, rather awed:

"Gee! What a girl!"

CHAPTER II.

Prices and Values.

DISTANT whistles were announcing the noon hour when the workshop door swung open with its usual abruptness and closed with the usual slam.

Beside the tiny forge Henry Darling seemed just to have finished another bit of work; yet his disapproving stare remained on the dying red of the coals even after Mace, with a shouted salutation, opened an extra window and found his eternal pipe.

"Henry," said the less sober member of the firm, "ask me where I've been?"

"Well, where the dickens *have* you been all night?" Darling demanded.

"Eh?"

"Because you were not at your boarding-house—I know that much," the collarless one snapped. "Mrs. Wells called up here after one o'clock woke me out of a sound sleep to find out whether you were coming back last night, or ever."

His eye was almost fierce as its transfixed Robert Mace, and Mace smiled slightly.

"Shall I admit," he murmured, "that I met several of the boys, that we had a big dinner on one roof and saw a big show on another, that we settled down to a big session of poker, and that I lost every cent we own and gave I O U's for seven hundred dollars more?"

"Bob!" shrieked Mr. Darling.

"Or shall I tell you the cold truth, you old fool?" laughed Mace. "Sit down there. Get ready for a shock! Are you ready?"

"Yes," Darling said grimly. "How did you lose it?"

"I didn't, as it happens. Henry, I have an appointment with Welling at three this afternoon!"

"Eh? Who fixed that up?"

"Welling!"

"What?"

"And now that you're calmer, I'll tell you how," chuckled the cheerful partner. "Henry, I told you I was going to see him. I've been looking up his personal habits these last two days, and the most interesting thing I found out is that every morning he takes a spin—usually with his daughter and his —er— secretary, I believe she is—and gets back to the city about half past nine."

"Well?"

"Poor old Harry Farwell, who used to work for us when we could afford a workman, has a job in the garage where Welling stores his car. I met him last evening, and that's where I got my information. Well, Henry, last night I had to talk to Farwell for two solid hours before I could overcome his conscientious scruples!"

"Eh?" Darling's eyes contracted.

"That's what he called 'em," Mace said cheerfully. "However, I got the best of them once the big idea had taken possession of me. Then I spent another two hours with Farwell, after all was nice and still in the garage, putting Mr. Welling's car in such shape that it had to break down before it had gone many miles. After that I slept two hours in a cast-iron chair, and after that I just borrowed a duster and a cap from a chauffeur and started out again!"

"I don't know what you're talking about!" Darling snapped.

"This: Along with the cap and duster I borrowed somebody's eight-thousand-dollar roadster from the same chauffeur —I overtook Welling, my son, when he broke down—I fixed his car more expertly than man ever fixed a car before. I got acquainted and—I'm going there at three to sell him the rotary. That's the whole story!"

Henry Darling caressed his lean knees and scowled.

"I think you've gone crazy since this thing finally allowed itself to be perfected," he said candidly. "You were able to do a day's work before that; now you're able to talk—and without saying anything! What—"

"I'm getting my tongue into shape for some great selling work," smiled Mace. "Was it a neat scheme, Henry—this little one that I pulled off?"

"If it's true it's the most ridiculous thing I ever heard!"

"Why? Because it was unusual?"

Double-edged comment fluttered on the tip of Henry Darling's tongue; he stilled its fluttering and brought forth one highly practical inquiry:

"How much did you spend?"

"Fifteen dollars."

"Out of thirty-two?" gasped Darling.

"Five for Farwell's feelings—ten for the chauffeur, Hen. His boss is in Europe and the car's supposed to be in dead storage just now. It's the kind of car I'm going to buy when we sell out the engine."

He waited patiently for commendation. It did not come. Darling, looking at him steadily for some time, finally spoke his mind.

"Then your first interview with Welling, on a lying basis throughout, was accomplished by bribing one poor fool, helping another to swindle his employer, and practically stealing a car you represented as your own. For this you have gambled away half of all the money we have in the world! It's a *bad* way to begin business dealings with a man, Robert!"

"Well, no one was actually murdered," Mace said mildly. "A more liberal soul than yourself might have considered these things a series of minor, justified subterfuges, you know."

"I don't!" his partner said briefly. "Melvin called up."

"Who?"

"Wilbur Melvin, patent attorney."

"When?"

"Half an hour ago."

"What did he want?"

"I suppose you led him to think we had some business for him," Darling said irritably.

"I never heard of the man in my life!"

"Well, his name and address are over there by the telephone, Bob. I understood that he knew you. He said he had heard that we had some patent work and that he'd like a chance at it."

"And you told him?"

"I told him that James Brittan had our papers and was handling things for us, of course."

"And?"

"That's all. He thanked me and rang off."

"Well, I don't know that I'd have told him who was attending to our affairs, Henry," Mace said thoughtfully.

He walked to the telephone and studied the name and address for a little; the name was unfamiliar, but the address must be down-town somewhere in the neighborhood of Welling's office. And since Darling had returned to his forge and was blowing it back to life again, Mace permitted his thoughts to drift to Welling's office.

Miss March, apparently, would be there; it did not then occur to him to wonder just why. She would be there and he would see her, and Mace glanced suddenly at his watch

Some ten minutes before three he was in Welling's anteroom, with a stern young woman of sixteen staring at his card. He had an appointment with Mr. Welling, yes; but that did not seem to carry great weight. He would have to see his secretary, Miss March, and, having been shown to the door of another and smaller anteroom, he saw her.

She should have been less attractive without the funny little automobile bonnet and the veil; instead, the severity of business attire seemed to render her even more charming. He stared in delighted astonishment—at her hair, her eyes, the faint surge of color that darkened her cheeks; and eventually it dawned upon him that she was saying for the second time:

"Mr. Welling is waiting for you, Mr. Mace."

"Is he?" The co-inventor came to earth suddenly. "I'll—go right in, of course."

He hurried forward to open a door she seemed bent on opening herself, and he braced abruptly and grew stern and calm, for at the big desk on the window-side of the inner office John Welling himself was just looking up. The door closed behind him, and with brisk, confident tread Mr. Mace advanced upon the chair which gave Welling full opportunity to study all visitors while his own countenance remained in the shadow.

"Well I'm here!" the visitor submitted blandly.

"I see that!" The faintest of smiles tempered the hard tone. "And let me tell you one thing in advance, Mr. Mace—or two or three perhaps. I am in a position, as you can ascertain readily, to buy outright whatever interests me. Second, in a preliminary interview of this character I don't care a continental

about the technical details of your invention; I want to know what it will *do*, Mr. Mace. Not what you think it will do, not what it might do under given conditions; but just what you're actually ready to show me in the way of performances ten minutes from now, *if* I demand it."

He leaned back and waited and Mace drew breath. This was indeed the terrible Welling, acting just as several unfortunates had said that he acted; but it happened that this particular inventor was armed with cold facts, and he smiled as he began:

"Good! Item one, this is a steam engine. Item two, it is a rotary steam engine."

"Actually?"

"Absolutely! The principle is new from beginning to end."

"Go on."

"Item three, it will work out as a commercial proposition—marine or stationary, big or little—as occupying about one-eighth the space of any steam engine to-day, requiring less than one-eighth of the space for boilers, weighing, pounds per horse-power actually delivered, about one-tenth of any of the types to-day, and—"

"Facts, please, Mr. Mace."

"These are facts," smiled the inventor easily. "We have a machine right up in that workshop at this minute, no bigger than your typewriter there, which will deliver seventy-five horse-power without straining anything."

"And I'm at liberty to drive up there now and see it?"

The inventor laughed outright.

"We should be tickled to death to have you, Mr. Welling; but after you had seen it working you'd be no wiser than now. There is a very neat, very substantial steel case over it all."

"Isn't the thing patented?"

"The patent has been applied for, but we're not advertising details of construction," Mace said cheerfully. "Several of the finer ones promise to work out to a point of further efficiency, where we'll have to get one or two minor patents on them. That, however, will be largely up to the firm that buys us out."

"Go on."

Robert Mace eyed the other almost mockingly.

"Mr. Welling," he said, "if the things I've told you are facts and you can settle that part inside of half an hour at any time—is there any need of going on?"

A rather grudging chuckle left the promoter.

"Frankly, no," he said. "Very well. We'll assume that you've told only the cold truth. You want to sell the thing outright, I understand?"

"Yes."

"How much?" inquired Mr. Welling bluntly.

"Candidly, I'd like to listen to a bid from you," said Mace. "Considering the dead certain relation of this invention to power production everywhere-in plants, on steamers and railroads, and all the rest—what is it worth to you?"

"Oh"—Welling looked out of the window for a moment and shrugged his shoulders—"granting everything to be as you represent, possibly ten thousand dollars."

"Ten thousand—*what?*" gasped the inventor.

"Dollars, Mr. Mace."

By way of answer the visitor reached for his hat

"I fixed the wrong automobile this morning," he observed sadly.

"You're putting a higher price on your machine?"

"I'm putting an absolutely minimum, spot-cash, real-money price on it of one million dollars!" stated the inventor. "I'm in the wrong office. Good afternoon, sir."

He rose, and Welling eyed him with considerable interest.

"You're not necessarily in the wrong office," he said. "Possibly you're just a trifle startling in the right office. Just what leads you to think the thing's worth a million?"

"The simple little consideration that it will cut sixty cents off every dollar now spent for steam-power, sir!"

"That's a modest statement."

"It's too modest for this thing, believe me!" Mace said warmly.

"And your mind is set on that million, eh?" Welling asked oddly.

"Isn't it a bargain price?"

The proprietor of the office leaned far back and his sharp eyes narrowed to a pair of slits.

"To whom has this been offered?"

"No one"

"You're sure of that?"

"Perfectly. You're the first man approached, Mr. Welling."

"And you're poor, eh?" the promoter shot at him unexpectedly.

"Poor!" Mace laughed with unguarded candor. "Poor isn't the word —er—I mean—"

"There's nothing unique or disgraceful about being pinched for money, Mr. Mace," the other assured him quickly, and an odd, soft quality crept into his voice that puzzled the inventor, cursing himself energetically just now for the involuntary admission. "And I assure you that I'm not the individual to try grinding down a man merely because he needs cash. That part has no bearing on the matter, but—" He drifted into thought again for several minutes; then, abruptly: "Mr. Mace, will you let this matter stand exactly as it is for two days, giving me the exclusive right to buy you out for that period?"

"Why—yes."

"Other things working out as they may—or may not —will the morning of the day after to-morrow be convenient for a demonstration? I mean not only a working demonstration, but an explanation of the whole affair?"

"Perfectly," said Mace, and his heart pounded.

"Because very few of us carry a million-dollar cash balance, as such, and I'm not among the very few," Welling said dryly. "If you'll let *everything* in the line of selling negotiations remain at a dead standstill until — well, to-morrow evening I'll telephone you as to a demonstration in the morning. Satisfactory?"

"That is—satisfactory!" Mace said throatily.

Thin fingers were shaking his own; Welling had risen and was dismissing him. There in the outer office the extremely charming Miss March was waiting and an insane desire came to Mace to rush to her and tell her the great news and—she was not there, he noted as he passed the door of the private office. And Welling was watching his departure rather narrowly, he noted as well. And he straightened up and tried to walk out with the sort of airy grace which would indicate how very much an every-day matter he considered million-dollar deals.

At the street door of the building, however, he paused and all but gasped. People were right about Welling's way of doing business. He had assumed, with much justice, that Mace simply would not dare lie about the merits of his invention and had acted accordingly. Plain intuition, not always reliable, but frequently enjoyable, told Mr. Mace that, the demonstration over, Welling was going to buy the Mace-Darling rotary at the full price!

In a pleasant dream he journeyed back up-town, tired and very content. He could even afford to smile at the wretched entrance of the old-time four-story private house that had long since passed to the purposes of half a dozen tiny manufacturing concerns; nor did the smile fade as he climbed to the workshop on the top floor and, kicking open the door this time, stood on the threshold and searched for fitting words to break the news to Henry Darling, doubled thoughtfully on his stool in the far corner.

And before the joyous outburst could quite take shape Mace's lips closed; from the big chair another leaner figure was unfolding. A tall, pinched young man of twenty-five or six came forward, one hand filled with papers, the others outstretched in greeting, and Mace was saying:

"Well, Bill Featherton!"

"The future Attorney-General of the United States is back in town," Darling submitted, with a faint grin.

"And looking for a job!" Mr. Featherton said, with a touch of bitterness.

He settled in his chair again, and Mace surveyed him with candid disapproval. Bill Featherton, bright young lawyer that he was, appeared not to have eaten regularly of late; his clothes, too, well-pressed, were decidedly seedy. Obviously, the company, somewhere in the West, which had been paying him a salary had suspended that pleasant custom some time before its recent failure. Anyhow, Bill looked thin and starved, and he was all out of harmony with Mr. Mace's brilliant mood, and —

"You're not broke, too?" Mace demanded.

"So near it that I'm expecting to take

a title company job at twenty per to-morrow," Featherton said sharply. "Forget it. You've finished the big engine?"

"We finished her up!" smiled the dapper half of the engineering firm. "Also, we have sold her!"

"Eh?" Darling's eyes opened.

"Or practically," Mace supplemented. "What's Bill doing with all the papers, Henry? Looking over your will?"

The lawyer glanced up and laid the typewritten sheets on his knee.

"You're not so far off, at that," he said. "I'm looking over the specifications and claims Henry prepared for that patent application."

Mace grinned broadly.

"He's a bear at that sort of thing, isn't he, Bill?"

The attorney scratched his head.

"He's some kind of animal, anyway; but I think it's one with hoofs and long ears," he said, with the cheery frankness of long friendship.

"What?"

"See here, you two," said Featherton earnestly; "just what do you consider this patent worth in real money?"

"Just about one million dollars!" responded Mace.

"And shall I tell you what it's really worth?"

"Do!"

"Well, on good, heavy paper, nicely printed," said the attorney evenly, "it might be worth five cents!"

CHAPTER III.

Patent Not Applied For.

THE farther a man may be from complete self-assurance the easier it is to disturb his poise. Henry Darling, listening to the words of his legal friend, exclaimed his loud and not particularly coherent astonishment. Mace, on the other hand, merely, smiled at Mr. Featherton and demanded:

"What's wrong, Bill? Have you been walking around too much in the heat?"

"Why?"

"Mad, my boy—that's what you are!" grinned the dapper member. "Henry knows all about those things; he must have studied his way through five hundred patents before he concocted that one"

Featherton snorted impatiently.

"Is it possible that you've tried to get this thing through without a lawyer?"

"In a sense."

"Why?"

"Because we needed the money a lawyer would cost, Bill," Mace admitted easily. "Old James Brittan's sending it in for us—which is chiefly because he's Henry's old family lawyer and we can hang up his account."

"And has he filed his application without reading it?" Featherton demanded incredulously.

"I guess he has. It has been in his hands for a week or more and "

"It hasn't, though," Darling interrupted. "I had to make two or three changes in the plans at the last minute, you know. I took the whole business to his office this morning."

"And the chances are, since you insisted on saving a dollar or two at this stage, that he has simply mailed the thing in to the Patent Office and—I give it up!" Featherton said caustically.

Robert Mace hitched his stool nearer.

"Don't give it up, Bill," he requested. "Tell us what it's all about — what is wrong with that carbon copy, anyway, or is anything wrong?"

Mr. Featherton sat back and pursed his thin lips grimly.

"On the dead level, Bob," he said, "do you know *anything* about patents?"

"Not very much. I've been leaving that end to Henry."

"And Henry has—well, tangled things slightly for you," smiled the lawyer. "A patent, Robert, primarily describes the device patented, doesn't it?"

"So they've always told me."

"And then, in the most specific language possible, it goes on and claims that the device will do this and that and the other thing that no similar device will do—eh?"

"Well?"

"Well, every one of those claims amounts to a separate patent, Bob, and any patent is just as good as its claims, and no better. The claims in this one are not broad enough to protect a new-style wooden toothpick!"

"But—"

"Wait a minute and I'll unfold all the beauties. You've sent in a perfectly clear drawing, of course?"

"The finest I ever saw."

"Then as soon as this particular patent has been issued, Robert, you two will have made a gift of your machine and everything connected with it to the great American public! *That's* what you've done!" the attorney finished with dismal triumph.

"But I thought—" Darling began.

Featherton's eye silenced him.

"It doesn't matter much now what you thought, Henry," he submitted. "It's what you have done—and the law's mighty clear on these points."

"Well, we wanted to keep the thing so absolutely secret until it was patented, you know—" the lank inventor began, with dazed desperation.

"And as a consequence you've said—actually—that you don't care about any profits that may accrue from the invention, and that you're willing to hand them to the next fellow if he wants them!" the lawyer finished for him.

Over on his stool one might have fancied that Robert Mace hovered on the brink of an apoplectic stroke. The serenity had all fled from his rather round countenance; the countenance itself, first red, had passed to purple, and now was fading out again, and it was actually pale before sufficient voice returned to Mace to ask

"Bill, *is that right?*"

"It's the rightest thing you ever heard, my son," Featherton muttered.

"And instead of protecting the rotary we're giving it away?"

"Precisely!"

"Well, I had a hunch that we were saving money in the wrong spot, secrecy or no secrecy, money or no money!" Mace roared suddenly. "What in blazes are we going to do about it, Bill?"

"For one thing you might keep reasonably cool and make dead sure that your papers have gone on to Washington."

"Do you suppose there's a chance of that?" Mace controlled himself. "Of course, there is! Old Brittan doesn't move more than a mile a year, anyway, and he—"

He bounced to the telephone and called for a number; he waited, foot tapping and face wrinkled, until:

"All right! Ring me up as soon as you get 'em!"

And then, hands in his pockets, Mace faced them nervously with:

"He doesn't answer—Brittan, I mean. What are we going to do if it has gone through?"

"File a decent set of papers, of course," Featherton smiled. "I'll help you evenings, and—"

"And day after to-morrow I've promised to show the thing to Welling, too, on the idea that the patent was safely under way, too!" Mace exploded.

An audible groan escaped his partner. Featherton, however, looked up with some astonishment.

"Why Welling?"

"I'm going to sell him the patent, Bill."

The attorney's jaw dropped.

"Do you really believe that, Bob?"

"Why not?"

"Well, Robert," Featherton said slowly, "there are—a whole lot of other people with as much money as Welling."

Mace studied him with lively curiosity.

"Yes, and there's a whole lot of veiled significance in that remark," he said. "What's the point of it?"

"Eh?" Featherton glanced cautiously at him. "How long have you been working on Welling trying to sell out?"

"Just one interview, to-day."

"How much does he know about it?"

"Very little."

"But he wormed out the general principle of your rotary?"

"As a matter of fact, no! But—"

"Then take my advice, Bob, and look somewhere else for your capital!"

"But why? *Why?*" Mace demanded. "Isn't Welling straight? Didn't he take care of Thurlow's harvester company? Didn't he have all to do with the automobile company Jenkinson made a dozen millions in? Didn't he finance Dimock's tin-plate patents?"

"He did," said Featherton. "And those are the ones you've heard about. But did you ever hear any one tell of the Cathcart ventilating system? Or about a man named Hicks, who actually did invent a substitute for the pneumatic tire that's on the market to-day? Or about one Fremont Larkin and the company he wanted to turn into a trust? I understand that Welling had something to do with all of 'em!"

"I never did," Mace confessed.

"That's because they were the kind of thing you don't hear about, and I'm not going on, thank you very much!" the other said flatly. "I may not be lawyer enough to make my salt, but I'm lawyer enough not to retail a lot of 'they say' information that may get itself repeated later on somewhere or other."

"But— Great Scott! I thought Welling —" the dapper one scowled

"Never mind what you thought," Featherton said solemnly. "Take it as the best piece of friendly advice you ever heard, my boy, and get your money elsewhere!"

He wagged his head very gravely indeed and laid aside the carbon copies of Darling's attempt at a perfect patent with a heavy sigh. He looked straight at Robert Mace, too, and that gentleman fairly jumped.

"Well, this is a nice way to bring everything down around our ears just when I thought we had things going to perfection," he said; "but I suppose we'll have to thank you for it, at that, Bill. I—confound it! I wish those papers had never left this place now, or that we'd made some definite arrangement with Brittan or something! I—see if he's answered yet, Henry!"

He waited, fuming, as the collarless member consulted the central operator, only to report:

"She says no one answers, Bob."

"That's funny. His clerk ought to be there at this hour, I should think. He always—" Mr. Mace broke off with an impatient jerk. "I'm going down to Brittan's and get that confounded stuff myself!" he snapped. "Good-by, Bill! Where are you staying?"

"Denslow & Anderson are letting me use their address for mail and so on," the attorney said evasively. "I'm going down there shortly to see—"

"Well, you tell Henry where you're living and let him fix things so that we can have a state dinner somewhere at about thirty cents a head and talk over old times," said the senior member hastily from the doorway. "I—good-by!"

The door banged on the last word and Mr. Mace was descending the stairway so energetically that the little advertising-button manufacturer on the floor below stuck his head into the corridor and looked queries after the top-floor tenant. He struck the street then, and hurried off for the corner and the surface car at a speed that took small account of the swarming childen on the pavements.

Brittan, to be sure, was among the thousands who had moved their offices up-town and Mace might almost have walked it, but something very like terror nagged him into reaching the small office building at the first possible second and laying hands on the ill-fated application

What the dickens had struck Henry to make such a mess of things, anyway? Why hadn't he, Mace, made a study of patents before letting the thing go out or, better still, why hadn't he insisted on going to a first-class specialist in that kind of law and paying the price? On the platform of the car he mopped his forehead and wondered, and with returning calm it all grew simple. That infernal, serious, learned face of Darling's, however much mechanical knowledge might lie behind it, had been misleading when it came to patent-law information.

And then Welling? What the deuce could be wrong with Welling? Every big man, as a matter of course, has his detractors by the hundreds; yet Bill Featherton was not the one to give that sort of warning without some good ground. What did he know and why was he too cautious to tell about it?

Or was Mace making altogether too much of a small matter? Some such conviction had come to him as he stepped into Brittan's building. In all probability the papers were up-stairs and he'd take them back—since Brittan had stated flatly that he did not care to handle patent law in detail—and hand them to some well-known man in the line, and Welling's demonstration would have to be postponed for a day or two. That was about all.

Almost cheerfully, then, he rapped on the corrugated glass panel and waited — and rapped again and waited once more, and then turned to find that the elevator man, who had held the car, was saying:

"I don't think Mr. Brittan's there, sir."

"But his clerk?"

"The young fellow went out about two or half past, I think—about an hour after Mr. Brittan left."

"Isn't that unusual?" Mace frowned.

"Yes, sir. I take it he went somewhere. He had quite a quantity of stuff. Mr. Brittan's always back between five and six, sir."

"I'll wait down-stairs!" said the visitor after a moment's consideration.

Ten minutes in the vestibule—a five-blocks' walk and back again—and the lawyer was still absent. Mr. Mace bought the paper and read for a time; walked again and returned at five for another fruitless inquiry; finally, with a jerk, went into one of the telephone booths and sat down. What in thunder right had Featherton to set a man fretting about his one picked capitalist? He pondered the question uneasily for many minutes; he ended by calling up the Denslow & Anderson office, and since it appeared that Mr. Featherton was in he demanded savagely:

"See here, Bill, I want to know precisely what's wrong with Welling?"

Mr. Featherton caught his breath audibly, but his voice came cool and even:

"I've just been talking that over with Denslow himself, Bob. He says that I was an ass to mention the matter."

"I think you were myself. Now tell me the rest of it!"

"And Denslow says that I'd be a bigger one to tell you any more hearsay stuff, however much truth there may be behind it, Bob," Featherton pursued helpfully. "And I think we'll have to drop the subject right there, old man."

"Is that -er -final?"

"Oh, it'll have to be," the young attorney replied rather wretchedly. "I'm sorry, Bob, but—"

Sheer temper at Mace's end of the line sent the receiver clicking onto its hook. He turned and scowled at the vestibule through the double glass door and said things that would never have gone over the wire without protest. Where under the sun had all this element of mystery cropped up from? Who was Melvin, by the way, the patent attorney who had called up Darling? He turned to the telephone book, more to pass time than for any other reason, and sought Mr. Melvin. His first name was Wilbur, and his address had remained in Mace's mind; but -there seemed to be no Melvin at all here! Some little time he poked through the book, and queer, nervous little notions assailed him; he resorted to the telephone again and asked for "information." No great length of time and the young woman had assured him that not only was there no subscriber by the name of Wilbur Melvin, but his address was at present an open excavation! Three years hence a fifty-story sky-scraper would be there; just now there was a hole in the ground!

Who on earth, then, was Melvin? Why had he called up? Or why had somebody else called up to inquire about their patent business and given a fictitious name and address? It was all more or less in harmony with a day he himself had started in too spectacular fashion and the elevator man was beckoning and pointing upward, and Mr. Mace quickened and left his stifling little booth.

Up in the corridor, shadowy now with approaching twilight, the familiar figure of the elderly lawyer was just fumbling over the lock He glanced up as Mace came near and then straightened up as the key turned, with:

"How de do, Robert? Been waiting for me?"

"I came an hour or more back."

"Wasn't Leeming here?" The faded eyes blinked astonishment at him.

"He left early in the afternoon," Mace said, with veiled impatience. "I—"

"Well, that's very peculiar—very peculiar," the elder man muttered as he stepped in and switched on the light. "That's the sort of thing I will not tolerate in a young man, Robert. Um!" He considered the office vaguely and his gaze wandered back to Mace. "You've come to ask whether your patent's been granted, eh?"

"Not quite that," Mace smiled.

"Well, the main thing I came back here for was to write Henry a letter about that application he prepared," Brittan said hastily. "I don't know much about patent law, Robert; but, offhand, I must say that Henry appears to be a genius in devising patents that do not protect! I advised him, in the first place, to seek out a man who specialized that sort of thing, but—"

His voice trailed away and Mace broke into his thoughts.

"Then the papers are still here?"

"They certainly are, Robert—drawings and all."

"Good!" There was keen relief in the younger man's voice. "I'll take them with me, and I'll take your advice, sir. Roreton & Roreton are a good firm?"

"The best in the business—the best in the business. And about the most expensive," said the lawyer as he fumbled through papers on his own desk. "They—now I wonder where I could have put those papers?"

"Ours?"

"Yes." Brittan pottered on, muttering—and the desk was quite clear when he faced Mace with: "Upon my soul, that's very odd! I can't find your papers anywhere, Robert!"

"They're somewhere about, of course?" Mace hazarded uneasily

"They must be. But I certainly left them in the very center of my blotting-pad here, and Leeming has most definite orders not to disturb my desk!" Brittan said positively. "I—*hello!*"

"What?" cried the visitor.

"Where under the sun are all Leeming's books? He was reading law with me!"

An elderly finger pointed at the shelves, two of them yawning black emptiness.

Brittan walked closer and examined them, scowling, and he turned to Mace with a far from reassuring.

"It looks as if Leeming had left for good!"

"But not with my patent papers?" gasped the inventor, with a show of great concern.

"Eh? God bless me, I hope not!" Unwonted speed seemed to have come to Mr. Brittan. "Just a minute, Robert. That was a very large envelope, you know. There are no drawers here likely to hold it, but just a moment."

He passed quickly to the desk of his absent clerk and turned over the few papers. He opened drawers and shook his head—and hurried to his own desk and opened more and shook the head again. He glanced behind his desk and behind the departed Leeming's, and having looked about the rest of the office, trim with little pigeonhole filing cabinets, he turned back to Mace with a finality that was blood-curdling.

"I guess he did take 'em, Robert!" he said. "They're not in this office!"

CHAPTER IV.

Leeming and Another.

A VAST alteration takes place in one's viewpoint and enthusiasm between twenty-eight and sixty-eight. In the forty-year interval one has seen endless bright prospects dull to heavy gray; one has come to fix values with less ardor and to know that the tremendously important thing of to-day is the very one that matters not at all to-morrow.

So that while all the blood in Mace's body seemed to have rushed to his head, while his hands turned cold and perspiration broke on his forehead and the whole room whirled around for a moment, Mr. James Brittan merely sat down, removed his glasses, and, while looking for the handkerchief to polish them, remarked:

"Dear me! That's very unfortunate, isn't it?"

"*Unfortunate!*" gasped the visitor

"I can't understand it at all!" The near-sighted eyes blinked around again. "Leeming seemed satisfied here. He"

Mr. Robert Mace collected his wits with a violent effort. It was rather plain that Brittan's thoughts were likely to speculate indefinitely on Mr. Leeming's departure as such, while

"Pardon me!" he fairly rapped out. "Have you no idea where Leeming went?"

"Eh? Not a suspicion, Robert"

"He had not mentioned leaving?"

"No."

"Well," the other cried thickly "did he seem particularly interested in those patent papers, Mr. Brittan?"

The elder man smiled slightly.

"He didn't know they were here even, Robert," he said. "Henry brought them in this morning, you know. I looked through them, saw what a mess he had made of it, and laid them right here, meaning to write as soon as I came in this afternoon. Now—"

"Now your confounded clerk has stolen them!" Mace said wildly.

Brittan shook his head.

"You're quite wrong there, Robert. I don't pretend to know why the boy

left, but he had no interest in that envelope. You're quite wrong."

"I may be, but do you know what those papers were worth?"

"No."

"One million dollars!"

Brittan laughed outright.

"My dear boy," he protested, "I—I—well, I suppose you think they are!"

"I don't think it! I know it!" Mace said violently. "I understand just how little stock you take in such things, I think; but—will you tell me about this Leeming?"

"What about him?"

"How much do you know of him?"

"He has been with me for a year. He's quite all right, I think."

"How old is he?"

"Twenty, Robert."

"He's never acted queerly before—never stolen anything?"

"He hasn't stolen anything now," Brittan said impatiently. "He—"

"All right, then, he hasn't, sir; but where does he live?" Mace panted

"Two or three blocks up-town. Do you want his address?"

"I certainly do!" said the visitor. "Live with his people?"

"I think not." Brittan muttered as he wrote. "There you are."

"Thanks! Now can you tell me where his people live, in case I don't find the the young man himself?"

The attorney leaned back with maddening calm and smiled in a fashion intended to soothe the red-faced individual before him.

"Frankly, no, Robert," he said quietly. "Leeming came here from the middle West and this was his first position. I think that his parents are dead; at any rate, none of his people live hereabouts"

"Then—"

"And wherever they may live or be, Robert, I want to say that you're exciting yourself quite unnecessarily about nothing at all. Leeming left here for some sudden and doubtless youthful reason of his own. A better position, offered unexpectedly, is the obvious thing, although I fancied that he was quite content here. At any rate, as you will find during the next twenty-four hours, he took your precious documents in his haste, mistaking them for something of his own."

The visitor jammed down his hat.

"I hope most heartily that you're right!" he said bitterly. "Good-by!"

"And drop me a postal when you locate him," the lawyer smiled placidly from behind his glasses. "I'm anxious to know why the boy left like that."

The office door slammed. Downstairs, in the elevator-car, the operator imagined that fire must have started on the fifth floor; he sent his car racing upward, and the red-faced young man bounded in and gripped his arm before the door was fairly opened, and cried:

"That clerk of Brittan's—the one who left—did you notice what he carried?"

"Why—books, mostly."

"Anything else?"

"Well, books, of course," reflected the elevator man. "And—yes, he had a big, square envelope—about that big—tucked under his arm, mister. Why?"

"Take me down, quick!" Mace answered weakly.

It was the fact, fast enough! Leeming—small, young, soft-voiced, inconspicuous—had walked off with the patent papers—and why? Robert Mace, stepping out and racing for the street, gave it up. Certainly the youth didn't look like a mechanical genius or the sort that would appreciate that very unusual set of drawings over which Darling had labored so long and earnestly. It was almost beyond belief that, left alone with the things for a few hours, he had grasped their full beauty and simply decamped with them. Somewhere behind that hurried departure Mace suspected, with a queer, chilly little creep along his spine, there was a motive he would have to discover, directly connected with the rotary, and his fingers itched wickedly to settle on the small person of Mr. Leeming

A trim girl answered his ring at the address Brittan had given, and she shook her head at the mention of Leeming's name

"He's gone, sir."

"Where?"

"He didn't leave an address."

"Are you certain?" Mace asked throatily

"We thought it very odd, sir."

"But has he left for *good?* Did he take his—his things with him?"

The girl stared at him for a moment

"Yes, sir. Mr. Leeming has had a room here for a year, you know, and he came home early to-day and—why, just packed his trunk and left, I suppose. The expressman took it two hours ago."

"And he went before that?"

"An hour or more, sir."

Robert Mace tried to smile down his too conspicuous excitement.

"Then tell me one thing," he suggested. "Did you see him go?"

"I saw him pass the window downstairs."

"Was he carrying anything beside his grip?"

"He wasn't carrying that, sir. All he had was a big, square envelope."

"About — so big?" came from the very depths of Mace's being.

"Just, I should say. He seemed in quite a hurry, sir."

"He was!" said the visitor dazedly "Good—good-by!"

In a hazy way he was conscious that the girl watched him walk slowly away. He understood, too, that there were a dozen more things he could have asked about the departed Leeming that might possibly have pointed to his associates or his next stop; but, more than all, he understood the one thing that pounded over and over in his brain—beyond any mortal doubt Leeming had stolen the patent papers!

Why? There was no answer to that just now; there might be later. And until some sort of clue appeared it behooved Mr. Robert Mace to rearrange the machinery of his lately too complacent mind and set it devising plans for the new situation.

By the time he had climbed to the workshop again and entered, this time with strange absence of noise and speed, one thing stood out in his mind with almost fearful definition. He brought it immediately to Darling's attention with:

"Henry, how long will it take you to make new drawings?"

"Of the rotary?" his partner asked blankly.

"Complete ones for a new patent—yes. How long?"

"A week at least. But why "

"Damn a week!" cried Mace. "Can you have a new set ready to-morrow morning?"

"No!"

Words no less than terrific were upon Mace's lips. He stilled them suddenly and brought his voice to a lower pitch.

"Then I guess we're done for, Henry!" he announced. "Brittan's clerk stole the whole thing — specifications, plans, and all—and disappeared!"

"*Stole!*" Darling tottered to his feet.

"He did. And if he has brains enough, knowledge enough, to put those claims in proper shape and get them to the patent office first — good night! We've got one chance, Henry, and that is to beat him patenting our own engine! I'm rotten at the drawing-board or I'd tackle it myself, but two of us can't work at the same time and you're twice as good as I am."

The lank inventor was swallowing and nodding and pushing back his hair.

"You mean that *everything's* got to be done over?"

"If there's any way of having it finished in time—"

Despite himself he smiled. Darling, like most serious people, seemed to be the man for the emergency. Already he had pushed things aside on the lighter workbench; he was hauling the big drawing-board into position and laying his little case of instruments beside it. T-square and triangles, snatched down from their hooks, landed on the board, and Mr. Henry Darling was fairly leaping at the corner cupboard and chattering to himself as he found sheets of heavy drafting-paper. He unrolled one and picked thumb-tacks from the block as he said:

"I won't bother soaking it and stretching it, Bob. It'll have to do this way. And I'll put in to night and all day to-morrow and maybe — I don't know whether I can stick it out, old man, but I guess I can—maybe by morning, day after to-morrow, I can have it done."

"And by that time you'll be ready for the hospital!" Mace muttered as he felt in his pockets. "Here's ten dollars of the firm's capital, Henry."

"Eh?"

"To eat with occasionally, you know, and don't forget the need for such things."

He started for the door, and Darling straightened up to ask:

"Aren't you going to stay here?"

"Is there anything I can do?"

"Um—no, Bob."

Mr. Mace laughed tartly.

"Then I'll run around to my room, I think. You know, Henry, that while the temporary shortage of cash may have forced me to cut out the meal feature of Mrs. Wells's peerless service, my room rent is still paid to the end of the week. I like your society, but if ever a man needed to be alone and think I'm the man and the time's now."

Darling sighed forlornly.

"Could the police catch Brittan's clerk?"

"That's one of the things I'm going to ponder," said Mace. "Good-by."

He turned and left, this time at something like a shuffle. It was well past six o'clock now, and the usual gentle hum of light machinery in the building had stilled for the night and, curiously enough, the clatter of his own shoes on the bare stairs jarred Mace. He growled angrily; sheer nerves were overtaking him, and for almost the first time in his life. Too much stifled worry lately about the dwindling of their microscopic money supply, too much genuine anxiety masked by the blithe exterior, were getting in their fine work—and it wouldn't do at all! Mace paused in the black lower hall and mustered his usual smile, with a little added good cheer, and the night watchman, smoking on the steps, saluted him rather grimly and, looking after the light-stepping figure, reflected bitterly that it was well to be young and free from care and—particularly this · prosperous.

There are homelike boarding-houses and others. Mace's was one of the others, as frequently happens when one decides that he must not pay more than just about so much per week. Cooking odors from below greeted him heavily on entering and helped dull certain healthy pangs of appetite that were beginning to stir. He would go up-stairs and meditate for an hour; after that he'd locate an inexpensive meal somewhere and—meditate further, in all probability. He lighted the gas in his room and closed the door, to sit down with an acid smile and stare at the inefficient burner flickering weakly.

It was a wretched enough room, although, curiously, its wretchedness had never impressed him quite so strongly before. Carpet, bed, chairs, bureau, and all the rest, were poor and shabby—and yet it was entirely possible that a week hence Mr. Mace might be thanking his stars for the privilege of sleeping here.

Remote as the moon from certain visions he had been cherishing privately anent that same next week, the notion almost sickened him. Fate actually seemed to have called the pretty little bluff he had presented — the excellent clothes, the engraved stationery, with *this* address as his home, the prosperous, contented smile, the assurance, and all! Fate had called it, and through the medium, primarily, of an infernal boy of a law clerk not five feet tall and, Mace could have sworn, without mechanical brains enough to appreciate a unique mouse-trap.

His blood took to boiling again. Whatever Leeming's motive, he would catch Leeming and choke the life out of him! He would put a description of Leeming into the hands of every policeman in New York City in the country — in the world! He would find him, alive or dead, and , incidentally, he would have to stop this too enthusiastic mental trend toward cold-blooded murder if he wished to accomplish anything at all effective.

A second edition of the workshop pipe lived somewhere in the bureau. He found it and his tobacco-bag, as well, he shed his coat and, lips compressed, settled down to summon back all the unruffled optimism that belonged to him.

It came after a time, as the room thickened with pungent smoke, yet it brought a new conviction far from comforting. Darling, toiling away there in the still shop, could not possibly have his drawings ready before day after to-morrow. Leeming, or whoever might have the original application just now, could have new specifications prepared in a matter of hours and the whole in Washington long before Darling had finished lining in his work. And since Leeming had been intelligent enough to commit the theft, there was no reason to suppose that he would not carry it through to the end.

Look at it as he might, a dreary certainty confronted Robert Mace—his one chance in several thousand of realizing the expected fortune on the rotary lay

in regaining those original plans before they left the city!

CHAPTER V.

Mr. Dryden and a Note.

FAR below, dishes were clattering incessantly, people talking, a laugh arising now and then. Up here the regions were all deserted save for the man who had eliminated the dining feature; and he listened gloomily, not with envy, but with a weird, forsaken feeling he could hardly understand. Yesterday, even, he had listened to the same clatter with a tolerant grin and resolved, in the course of a couple of weeks, to charter a couple of cars and give that forlorn boarding contingent one evening of vibrating life. Just now—he listened!

In the upper stillness light steps were climbing the stairs slowly. He quickened abruptly. Whoever was coming they wished to see him; and he expected nobody, knew of nobody who might call save—could it be Leeming, repentant?

So readily does the wish become father to the thought that Robert Mace leaned forward in his chair with a sudden, eager smile. Very likely it *was* young Leeming, and he had taken the papers by mistake and yes, the steps were pausing at his door, too! Mr. Mace rose suddenly, frowning, and waited for the knock.

It came. He opened the door slowly, as befitted a stern, wronged man about to confront a repentant sinner, and he sighed, for imagination had played him false this time. No one more thrilling than the younger of the two overworked housemaids faced him, and she held forth a card in listless fingers and said:

"He wants to see you."

"Eh?" Mace stared at the little pasteboard and frowned anew.

Philip Dryden! Who on earth was Philip Dryden? Rapidly casting over the few new acquaintances he had made this last two or three years, Mace could recall nobody with that name. Whoever he might be it was hardly likely that he had anything helpful to suggest just now, and Mace did not wish to break off a train of thought that might shape into profitable planning soon; and yet there was something very prosperous about that simple little card, something suggestive of the well-founded opulence that needs no ostentation.

"What does he look like, Jane?" escaped him.

"He's a swell, Mr. Mace!" the girl said, without much interest.

"He — what? Well — send him up, please."

He waited, scowling thoughtfully, as the girl scuffed down-stairs. He opened the window, since the mysterious Dryden might not be acclimated to the same percentage of tobacco in his breathing air that Mace seemed able to survive; and then Robert Mace, self-possessed though he might be, came near to catching his breath at the sartorial vision that stepped into his humble apartment.

Possibly forty, Mr. Dryden was garbed in informal evening clothes of no more than this morning's designing; his very light overcoat hung open; his silky Panama hat swung in a silk gloved hand A moment he surveyed Mr. Mace with one of the most charming smiles that gentleman had ever studied, and then the cane shifted to the left hand and Mr. Dryden was offering his right, with:

"Mr. Robert Mace?"

"That is—my name." The inventor came near to stammering. "If you'll let me have your coat?"

The smile rested upon him again and Dryden, with a nod of protest, slipped out of the garment and tossed it to the bed. Hat and cane followed; the beaming smile took in the whole room with a pleased appreciation that would not have been amiss in an art gallery.

"Nice little place you've got here, Mr. Mace!" said Dryden

The other winced.

"That's the most polite fabrication I ever heard!" he submitted candidly.

The visitor laughed outright as he settled easily into the creaking rocker.

"Don't like 'em, eh?"

"Not when a place like this furnishes the subject and I happen to be living in the place," Mace admitted dryly.

"Well I don't know." Dryden crossed his legs and grew rather sympathetic. "No end of worse things can happen to a man than living in a New York boarding-house, you know. Smoke in here?"

He produced a flat little cigar-case, gold-edged and expensive, and tendered

it to Mace. He accepted a match from that puzzled individual and carefully puffed a really remarkable cigar to an even fire, while Mace did likewise and waited for—whatever might be coming next.

"Frankly," said the charming visitor, "did you expect to see me here?"

"Frankly," said Mr. Mace with utmost truth, "I did not."

"Nevertheless, I turned up on time, you see. Welling—"

"Are you from Mr. Welling?" Mace broke in.

The other stared for a moment.

"I'm his—oh, confidential man, I suppose one would call it. I close up most deals for him. I fancied you knew that."

"I didn't," said the occupant of the room bitterly, "and if—"

He caught himself abruptly—too abruptly—yet Dryden appeared not to notice. He glanced at the grimy ceiling and masked some of its unloveliness with a cloud of blue smoke before:

"And I've come about your rotary engine, of course, Mr. Mace."

"Yes?"

"Come, in fact, to buy it," beamed the visitor, and then sobered suddenly "Or, rather, perhaps, to offer to buy it on terms you will not accept."

"I don't understand."

"I'll make myself as clear as I can, although it's rather hard to explain a person so difficult as Mr. Welling. He is willing to buy the bare idea, Mr. Mace, and have it developed himself."

"It needs no developing."

"That's the inventor's view of it, of course," the visitor said gently. "Believe me, Mr. Mace, there's just about one case in a hundred in which it isn't necessary to spend thousands on thousands putting a man's theoretically brilliant ideas into practical, commercial shape."

"Then this is the one case, sir," Mace said warmly.

"Well—perhaps it is," smiled Dryden. "Don't glare, Mr. Mace. This isn't my personal doing. I'm paid to handle such things for Mr. Welling and submit them in such form as he directs, without forming any opinions of my own. You understand that?"

"But the man hasn't the most remote idea of how the thing works!"

"Possibly not; but I'll warrant that he has a very clear idea of how *you* work, Mr. Mace. Welling is a very shrewd judge of men, and he has very quick ways of learning whatever he may want to know about an individual. If he has decided to send me here to make an offer he knows exactly why and how he fixed his values, be sure of that. His methods may be rather unusual, but they've made millions for him."

"I know that," Mace muttered; "but—"

"So let's get it over with," Dryden said rather uneasily. "Would you consider an offer on such a basis?"

"How large is the offer?"

"Five thousand dollars, spot cash," Dryden said evenly.

An instant Robert Mace's mouth opened wide.

"Has that man the infernal nerve to offer—" he began furiously, and stopped. There was no use working up a rage at Dryden, smiling helplessly just now and shrugging his shoulders. Dryden probably was not responsible, and whether he happened to be or not, what had Mace to sell *now?*

"I—can't accept that!" he said thickly.

"I supposed not."

"And I may as well tell you candidly that I can't accept anything else just at present," Mace pursued bitterly, "so there's no use dickering around if you have anything more entertaining to do with your evening, Mr. Dryden. The patent papers—drawings, specifications, and everything else—have been stolen!"

"Stolen!" The visitor's eyes opened wide.

"Yes, by a measly little law clerk, and if he has sense enough to get it into the patent office before we have a chance to prepare another set—oh, I don't know."

Dryden's head was shaking with genuine sympathy. He considered Mace for a little and his smile appeared again presently. He seemed, indeed, to have reached a decision of his own, for he brought his chair closer and said earnestly:

"I don't know, either, why it should end these particular negotiations!"

"Eh?"

"Your papers are gone. If I'm right—pardon me!—you haven't capital

enough just now to press a suit if some one beats you to the patent. Is that the idea?"

"Um—I'm afraid so."

"All right. Welling *has!*" the visitor said significantly.

"Just what is this leading to?" Mace asked curiously.

"*This:* I haven't been empowered to do anything of the sort, but I'll still take it upon myself to buy you out for five thousand, Mr. Mace—and let Welling spend another five or ten thousand finding your crook and making him wish he'd been born dead!"

The coinventor of the rotary stared at his visitor for a moment.

"Welling would never stand for that," he said uncertainly.

"Welling wouldn't have anything to say about it, once I'd handed you the money and taken your assignment," smiled Dryden. "It isn't the way I do business as a rule, Mr. Mace, but bosh! You're up against it, my dear boy! This whole room's telling about it this minute. I'd like to help you."

"But—"

"And have no fear that Welling will not get his money's worth. He's able to have any crook in America caught—and drawn and quartered afterward, if he really sets out to do it!" Dryden laughed shortly. "It may be a month or it may be a year, but sooner or later Welling will have your engine brought to a practical point and patented, and there will be no flaws in the patent, either! Well?"

Temptation of an almost overwhelming kind was working within Robert Mace. On the face of it Dryden was talking cold sense. Welling could do what he and Darling couldn't do. He might easily be facing the choice between starting life over again with five thousand dollars or with nothing at all. And still—*five thousand dollars* for even a chance at an engine he verily believed cheap at a million!

"Thank you, I don't think I'll do it!" Mace said flatly and almost involuntarily.

The visitor nodded slowly and tapped his pocket.

"It's cash, you know, Mace—bills—real money."

"Nevertheless, I think I prefer taking a chance as things are," the inventor said rather doggedly. "I—think we'll leave things as they stand!"

As concerned Dryden the incident was closed. He rose and beamed on Robert Mace with all his former impersonal friendliness. He glanced at the even-burning cigar as he murmured:

"You're the man with the say, Mr. Mace. Personally, I think you're foolish."

"It's my own folly, then," said Mace bluntly.

"Well—of course, it is!" Dryden's tone grew startled and chilly and he picked up his belongings. "I think you've been handed rather a rough deal and I'd have liked to lend a hand—that's all. Good night, Mr. Mace."

"Good night!" said the inventor as he took fingers that had grown limp and perfunctory. "And I wonder—"

"What?"

"Nothing!" said Mace as he opened the door.

Alone, the superb cigar grew tasteless in the deep thought that overtook him. *What* had been the meaning of that call? Why, in the first place, had Welling any reason to think, under any possible circumstances, he would be willing to sell out for such a sum? Why, again, was Welling willing to buy an engine of which he knew absolutely not the first principle? And, more than that, why was this Dryden person willing to pay out Welling's real money for an invention he might never possess?

There was, of course, the ever-present possibility that matters were just as Dryden had represented. Five or fifty thousand dollars were nothing to Mr. John Welling; also, there was no reason to doubt his ability at finding people that money could find. And yet it was, all of it, the queerest business proposition Mace had ever encountered!

Behind it all, beyond any doubt, there was plenty of motive; yet when he began to search for it possibilities piled so rapidly that he was lost among them. He could assume that Welling was a criminal on a large scale and then assume—Mace ceased assuming for the moment and took to listening once more. The light steps were ascending the stairs again.

Yes, and they were making for his door, and the girl was knocking. And

so thoroughly was Mace familiar with his very few friends that he jumped to another conclusion. Mr. Dryden, having given him twenty minutes or so to change his mind, had returned. He stiffened as he opened the door.

Mainly a tired yawn was visible, framed in untidy hair. The hand extended presented him with a note.

"Messenger delivered it just now!" said the maid and turned away again.

The door closed and he stared at the envelope uncomprehendingly. His name, his address, appeared in a fine, round hand, he turned the thing over and looked at the back, lips pursed and quite suddenly Mr. Mace understood what was puzzling him. Thoroughly acquainted with the envelopes used by his few business correspondents, this was an unfamiliar thing—a woman's stationery!

He muttered to himself as he tore the envelope and wondered who could possibly have taken to sending him notes by messenger. He came nearer to the light and read in the same quick, round hand:

> No matter what else you may have on hand, will you please meet me at the corner of Broadway and Eighty-Sixth Street at nine o'clock this evening? I will wait ten minutes. *Important to you.*
>
> DOROTHY MARCH

And there Mr. Mace permitted himself a thunderstruck gasp! This distinctly informal, hastily written epistle came direct from John Welling's own amazingly pretty private secretary!

CHAPTER VI.

After Nine.

MANY seconds Robert Mace stood rigid. Had he but glanced in the mirror he would have caught a reflected smile almost foolish in its utterly pleased quality, and perhaps it would not even have occurred to him to wonder at the smile.

Dorothy March — it impressed him suddenly that Dorothy March had been lurking as a rose-colored background to his every thought since morning, and he sighed. And she had written him a note —*why?*

Promptly enough the one obvious explanation came to him, and Mace fairly sizzled self-contempt for permitting such a thought! Of all young women in the world this was the last capable of a vulgar flirtation. He was almost frantically positive of that much; although, in view of the fact that he had seen her just twice, on each occasion for a matter of minutes only, a calmer mind would have had some trouble in deducing just how he reached the settled conclusion. Still, he knew it; and, knowing it, sought for a reason of tenable character.

And another almost as unpleasant shaped itself. Before that last rap on his door he had been formulating a theory which branded Welling a criminal and Dryden his guilty agent. Dryden had had time to report by telephone; preparedness granted, there had also been time to send a messenger. So that if, Dryden failing, Welling had resolved to use the girl's wonderful beauty as a persuading agent — Mace choked off the thought angrily.

She was incapable of lending herself to such a purpose — and he could go no farther, for new queries were swarming on him. How did it happen that Welling had possessed his personal address? Mace had not given it; it was in neither city directory nor telephone book. Again, it was unlikely that Henry Darling could have furnished it, for there was a certain connection in the telephone circuit which Darling invariably loosened when busy — and surely the wire was hanging free just now! More than that, how did Dorothy March know where he lived? He ran over that brief wayside interview of the morning and shook his head; he had made no mention at all of his residence. For all they knew to the contrary, he might as well have been found at home either in the slums or in the biggest house on Riverside Drive And yet they *did* know where he lived!

The letter he folded with a care almost tender and placed in his inside vest pocket, which was odd, because Mr. Mace usually tore up personal communications immediately upon reading them. He stepped very close to the mirror and examined himself minutely. At least one dozen hairs were out of place, and he brushed them back; there was a microscopic speck on his collar, too. He found a clean one and, temporarily bereft of any sense of humor, looked himself in the

eye and pretended to debate whether the appointment had best be kept. He decided in a matter of three seconds that it were better in any case to find out just what Welling meant by daring to use such a girl in his plans and, further, by daring to make plans which permitted her to be alone on the street at night. And, having decided, his brisk habits reasserted themselves in abnormal fashion. It was not twenty blocks to the corner and the hands of his clock were at half past eight, yet he hurried about the bleak room much as if flames were licking the door-sill.

Wherefore, before the hour, Robert Mace stood on the specified corner, breathing rather rapidly, and looked about; and even as he looked a slender figure appeared from the side street and confronted him, and he, the self-possessed, was actually stammering his:

"Good — why — er — good evening, Miss March!"

Welling's secretary faced him with troubled eyes and wasted no time in stammering preliminaries.

"Shall we walk, Mr Mace? Just a little way."

"I shall be more pleased than—"

"This isn't just a -a walk for pleasure," the girl smiled faintly. "I—well, I came out ostensibly to mail a letter, and I can't stay long without causing comment."

The coinventor of the rotary nodded in somewhat dazed silence; it began to look like a flirtation, and yet he could have sworn -

"I'm a—very distant—relative of Mr. Welling, you know," the girl said.

"Yes?"

"And I live with them — with Mr. Welling and his daughter. Alice is—just dear," she continued in an uncertain, jerky way that brought uncomprehending lines to Mace's forehead. "But—"

A good half-minute passed in silence.

"Well?" smiled Mace.

"That's how I happen to be in the house, of course." Dorothy looked at him with disconcerting suddenness as they passed the corner arc-light, and there was a somber fire in her deep eyes that passed any understanding of Mace's. "I am the—the poor relation and it's very good of him to employ me. Isn't it?"

"Eh? Why—I suppose so!" the man smiled in bewilderment.

"And still it doesn't justify—"

Her words died out again. A full block they covered slowly, and at the end of it Mace began to feel rather giddy. For all this, too, there was doubtless a reason; twice the girl glanced up at him and the eyes, thrilling him, conveyed as well a suggestion of hidden meaning all beyond him; and now, abruptly:

"He sent Alice to her aunt's this afternoon—to Lenox!" she said.

Robert Mace drew one long breath.

"I see!" he said gently. "Just what is it all about, Miss March?"

An instant the upturned eyes were startled, and then, suddenly frank, the girl laughed ever so softly.

"I'm not very lucid, Mr. Mace, but—did you ever stand between two fires, knowing exactly the right thing to do on one hand and exactly what you were expected to do on the other?"

"Being an adult human, yes," Mace said rather blankly.

"And it's hard to decide which is worst —or best—isn't it?"

"I don't know. I've always found that doing the right thing was the best bet for most of us and—"

"True!" the girl said quickly. "I'll —do it while I have the courage, Mr. Mace. About—well, about Alice. He has sent her away twice before when he has been on the verge of doing something—not quite right. I think it's a sort of symptom. I think Alice brings out all that is best in him and that he cannot quite—well, do some of the things he wants to when she is about."

"You're talking of Mr. Welling?"

"Yes, and now that I've started I'm going through to the end!" There was a suggestion of hysterical catch in her voice, but she smiled at Mace. "I'm so tired of being the perfectly safe repository for secrets that wouldn't stand the light that I can't endure it much longer. And this one is so contemptible that—"

She stopped again and looked at Mace, this time half in terror.

"Mr. Mace, you *haven't* sold him your patent?"

"Eh? No."

"And you haven't given him the papers to look over?"

"I certainly have not!" Mace said bitterly.

"Then I was right!" The girl's lips tightened. "But they are in Mr. Welling's house at this minute!" said the promoter's private secretary.

Some two or three seconds the coinventor of the rotary suspended breathing. Eyes wide, he stared at the girl beside him, facing him steadily now and with visible relief; and when he did find speech it was of no particular coherence.

"They *what?*" gasped Mace.

"They are in the library, under a corner of the rug!"

"You saw them there?"

"I saw him put them there, although he didn't know it, Mr. Mace. I had seen him looking through them earlier — he was home when I came up-town from the office—and I asked him if he had closed the matter so soon."

"And?"

"He only smiled, Mr. Mace, and—I knew the smile."

"Did he?" exploded the inventor. "Well, by—"

"Hush, please! And we'll turn back now, if you don't mind. I don't want to be out too long, although he hardly suspects—I've been so very reliable with so many queer details."

"Why?"

"Because I'm not independently wealthy, Mr. Mace," the girl said quietly, "and he told me a year ago, when oh, something came up—that I'd stay with him or he would keep me out of a position until "

"I understand, and I beg your pardon," Mace said quickly. "I'd like to take that hound by the throat and choke him until he yowled—"

There was a touch of real mirth in the little laugh just beside him.

"It's not quite so bad as that, Mr. Mace. I've been looking around quietly for another secretaryship, and I think—shall I tell you the rest about the papers?"

"Will you?"

"I don't know what it was, but something made me suspicious this morning after we came back from the ride—that was an occasion, by the way, because Alice insisted on taking me. I'm usually at the office by nine. However, we did come back, and he was very thoughtful and let the morning mail go over until afternoon, which is always a bad sign with him, I think. Then he called up Dale and Wilmer—the big lawyers, you know "

"The biggest law crooks in the country!" Mace interpolated.

"They're Mr. Welling's attorneys, at any rate," said the girl, "and they sent their man Dryden down. He lunched with Mr. Welling."

"And together they cooked up a little scheme by which the clerk of our old fossil lawyer was bribed to steal the papers, and he stole them and delivered them and that is the entire story!"

"Is that what happened, Mr. Mace?" the girl cried.

"That's exactly what happened!" said the inventor thickly. "And now—"

He broke off; profanity seemed to have been bubbling to his lips all afternoon and evening. And the girl was smiling again now, in that uncertain, half-frightened way that sanctified the prosaic street and everything connected with it!

"But I wouldn't have you risk anything for that patent or fifty like it!" Mr. Mace stated flatly. "I wouldn't—"

Light fingers resting on his arm steered him around the corner; unconsciously his arm came closer to his side and the fingers escaped as Dorothy said:

"I'll show you the house and I'll show you my window, Mr. Mace. If you will leave me in the middle of the block and then come back at half past eleven, I'll try to drop your papers to the street!"

"Eh?" exclaimed Mace.

"Mr. Welling is always in bed by eleven, and I am sure I can get them without being heard, and—there! We'll stop here, please. The white house—the second one from the corner."

"I see it."

"And my window is the last one on the third floor; do you see?"

"I do indeed, but—"

"And now—good night, Mr. Mace."

His own hand fairly clutched the slim fingers and Mace's heart hammered oddly.

"I don't know how to thank you," he said breathlessly. "You cannot possibly appreciate what this means to us—to me. But why on earth are you doing it, when—"

For the briefest fragment of a second the girl's eyes met his own, and there was a new light in them, too! He could have sworn it, without being able even to guess just how they differed from the same eyes a moment before — or a moment later, for that matter. And she had turned away with a quick:

"Half past eleven. Good night, Mr. Mace."

Hat in hand, the inventor watched her almost stupidly—saw her slip lightly toward the corner turn and ascend the half dozen steps—and vanish. He was still standing there when a plain citizen, undazzled by smiles, untroubled by patents, passed and paused for a second to look at him, and then walked on with an amused snort. With hazy gratitude for the awakening snort, Mr. Mace replaced his hat and turned slowly away.

Dorothy March had elected to tell of her employer's machinations because—well, because she had taken too much of a liking to Robert Mace to watch unaiding as his ruin went forward! It was the truth! He knew it to be the truth, and he thrilled again in an utterly absurd fashion that would not have impressed him as at all absurd, even had he been capable of analyzing his sensations just then. For his sake she was risking—why, all she had to risk! That trip to the library, when the house had quieted down, was like jeopardizing her position, her living—yes, and even her personal safety. At the farther corner Mace stopped short, eyes snapping; he had not thought of that! Welling, since he was already so deep in villainy, might easily be capable of violence should he discover what was afoot that evening!

In the twenties one's mental processes turn feverish at small provocation. A moment it occurred to Mace that his one course was to summon the police and have the house surrounded, waiting for the first terrified scream. Two minutes, and this had toned down to a plan which involved his own stealthy lurking very near to the house until the appointed hour—alert, tense, ready to dive through a window to the rescue at the first suggestion of trouble. Five minutes, and some of the steady, normal qualities which had enabled him to shape many features of the Mace-Darling rotary again held sway in his brain. It was unlikely that so clever a young woman as Dorothy March would permit herself to be discovered; it was very likely, indeed, that Mace could spoil everything by loitering within range of the windows.

A queer progress along clouds brought him to a park. There was a river at its foot, which he placed vaguely as the Hudson. There was an isolated bench, too, evidently waiting for some one in his frame of mind, and he settled upon it and a rather odd thing happened. For a matter of two years Mr. Mace had thought, dreamed, eaten, and talked rotary steam engine; his first vision upon awakening had been a certain familiar jumble of plates and cranks and valves, with a wake of thousand-dollar gold certificates floating behind; his last definite impression at night had been essentially the same.

Yet now, staring with unseeing eyes at the lights on the Jersey shore and the moving yellow spots that were steamers, the rotary engine departed from his mind. Two hours and he would again have his patents and all would be well; just now something infinitely more important claimed his attention. Robert Mace knew as well as any one else the fallacy of the love-at-first-sight theory; but out there in the blackness over the river, framed in dark hair, mystic as to eyes, wonderful in its rich coloring, the most beautiful face in the whole world floated before him, and his hands clenched as he stared at it and sighed—and sighed again. And then, having leaned back and looked at the skies and found the same features waiting for him up there, Mace smiled and shook his head—and sighed once more.

Now a process of unending sighing is one that needs expert interpretation. The policeman had seen many a heavy sigher in that same park sigh himself or herself to a definite and sinister decision, and thereafter drop inconspicuously to the railroad tracks below or the river itself; and eventually he coughed so loudly that Mr. Mace returned to earth and looked at him in astonishment.

The moon, quite visible at his last remembered glance aloft, had vanished. There was a deserted air to the park. The fixed stare of the policeman, too, previously an unconcerned individual, suggested that Mace was not even wel-

come here. He glanced at his watch and bounced up with an exclamation so perfectly normal, however, that the policeman sauntered on—and it was just twenty-four minutes past eleven!

A temptation to rush madly through the deserted streets was stilled just in time. He set out at a walk, however, that came near to being a trot as he progressed. He cursed himself for going into the trance, however delightful it might have been in itself; and then he slowed down, for this was Welling's block, and instinct sent him toward the house almost on tiptoe.

It was a situation with something of a thrill, too, he reflected. Contemptible crime was about to be thwarted by the prettiest, the cleverest girl in the world; Mace tingled as he came within a dozen feet of the house and looked up with unnecessary caution.

Summer was not yet far advanced. Most of Welling's windows were closed—notably the last one east on the third floor. He squinted at it and came closer; and even as he looked upward the lower sash began to rise, slowly, carefully, without a creak.

It meant that all was well! Ten seconds more and his precious specifications, his infinitely more precious drawings, would swish down through the night, and he would snatch them up and leave before Welling—ah!

The window was quite up now, and a slender hand appeared indistinctly in the opening. The fingers, too, seemed to hold, certainly not his big, square envelope, but a tiny square of not more than three or four inches, and white. Curiosity leaping within him, Mace came almost to the edge of the steps and watched the white arm thrust out quickly and waving as if to attract his attention!

His lips parted for a faint answering whistle—and the sound never came, for, very suddenly indeed, the arm was snatched back, white square and all, not with a smooth motion suggestive of the girl's own volition, but with a sharp jerk, as if some one within had seized her.

Ever so faintly, too, there came to his ears a rustle—a sound as if some one had tried to speak—and the bare arm had shot into sight once more!

Only an instant it remained visible this time and it was gone again, with the same quick jerk. But from the fingers the little square of white had been dropped. It was fluttering downward now—slowly, swaying back and forth in the still air. And it struck squarely upon the cornice over the main door of the house and—stopped.

Above, without haste or undue sound, the last window east on the third floor was closed.

CHAPTER VII.

The Burglary at Wellings.

HOT-BLOODED impulses were struggling for control of Robert Mace that evening. A vision flashed before him of Dorothy March being ruthlessly murdered in that upper room! He pounded up the several steps and raised his fists to hammer down the door without further ceremony and there, mercifully, native common sense came to his rescue before neighbors or the constabulary noted the move and started trouble for him of the most genuine sort.

Rather startled at himself, he descended to the sidewalk and stared upward. Perfect quiet reigned everywhere—and, as a matter of fact, conventional capitalists of several decades' prominence hardly commit murder in their own homes, and certainly not without bringing a shriek or two for help from the victim.

Indeed, despite his own impressions it was quite possible that the girl might have been startled by some sound within and darted back; and then, whether the sound had continued or not, resolved to chance dropping the square of paper to Mace. In any event, two things were beautifully clear: his patent papers had been nowhere near that window and the presumed note which probably explained their non-appearance was securely lodged upon that infernal cornice

The first substantial puff of wind, of course, would dislodge it. Mr. Mace stepped into the shadow of one of the block's few trees and stared at the cornice and waited. The air had been very still all evening; so far as he could recall, there had been no more than a very faint puff of breeze now and then even in the park by the river. Now even that

was quite gone—and a good five minutes had gone, too, and the note was still ten long feet beyond his reach.

A dozen wild schemes welled up in the inventor's mind for the securing of the little square. A jump would take him into the lower branches of the tree, and he might be able to wrench off a small limb and brush at the top of the cornice; some one in the house next door to Welling opened the second-story window just then, glanced out, pajamed, and disappeared promptly. But it would take him some time to drift into slumber and the first unusual swishing out front would bring him to the window.

No sign of wind appeared. Would it be possible, by joining the several bits of string in his pocket, to construct some sort of snare capable of being thrown to the damnable length of white stone and raking its width? A brief consideration caused him to abandon the notion. Or would it be possible for him to make a quick ascent by way of the parlor window-sill, get to the cornice, and drop again before Welling or somebody else could see him and set up an alarm? Again Mr. Mace concluded sadly that there were too many unpleasant possibilities in the way; one slip and he would land below, very likely with a broken neck, certainly with a great deal to explain to the crowd that seems able to gather in the middle of a desert at the first hint of an accident.

And now, by actual time, he had been studying the edge of the cornice for more than quarter of an hour, and he was no nearer the captive bit of paper than at first—and the house remained quite as calm as at the moment of the window's closing.

What could be in that note? What did it explain—what did it tell him to do that he was not doing? What bearing did it have on the recovery of his papers? What a maddened little growl escaped Mace and he stepped lightly back toward the entrance. There *must* be some way of getting to that cornice, since the wind refused to materialize; on the second step he looked upward -and then started nervously and glanced toward the corner near at hand

Somebody had yawned. The yawner was standing there, too, near the light, although, happily, his eyes were not pointed in this direction. And right there Mr. Mace's nerves all but brought a yelp from him as he bounded soundlessly back to the pavement; that individual on the corner was another policeman, swinging his club and doubtless thinking great solitary thoughts, but on the verge of turning in this direction.

A second the inventor poised on tiptoe; then, with an effort, he struck a sedate, placid stride and walked toward the corner himself. The representative of the law was coming—was abreast of him—was past now, and Mace would have to turn the corner at least and then wait until the wearer of the blue had finished his ill-timed walk down the block and disappeared at the other end.

He made the turn, fuming, and glanced back over his shoulder; from here, however indistinctly, he could descry the tiny bit of white on its elevation. He paused and groaned and watched it, and the officer as well; and the latter seemed to have all night before him and a particular liking for this section. Ever so slowly he loitered along, pausing now to look up and down a house boarded for the summer, halting again to examine a basement door, finally, after an eternity, reaching the distant corner and pausing again to dandle his club and consider further the affairs of the night.

Yet, after all eternity had passed, he strolled on out of sight, and the little paper was still in its place. And this time Robert Mace intended to get it, were it necessary to borrow a ladder and scale the distance to that beastly cornice! His jaw set as he turned down the dark street again—and stopped in the very middle of a stride!

Two feet above the much-desired spot a window opened suddenly. Out of it came the head and shoulders of a man It might have been Welling, although, the poor light and the felt hat considered, it might as well have been any one else. The vile thing about him was that his goal seemed to be Mace's own, for he looked downward, and then reached downward; and, the first attempt failing, flattened himself across the window-sill and stretched his hand toward the cornice. A second or two of reaching and he drew in again, and in his fingers was a little square of paper that had dropped from above.

That window, too, closed gently as the other—and the inventor of the rotary came near to shrieking!

Whatever the note had held, it was gone now, and gone to make trouble for Dorothy, too! What was he to do? Would there be any use whatever in going straight to the door, ringing, and demanding admittance? Having gained it, what next? He could not well hope successfully to accuse Welling of having his papers and demanding them back; neither could he shake his fist under Welling's nose and threaten him with death if one hair of his secretary's head were harmed, unless he wished to make himself ridiculous to no end whatever! Subtler means were needed here, and, to save his life, Mace could not begin to formulate them. In a fierce undertone he spoke his full sentiments, and it was a mercy that none was near to listen; having spoken them, he had walked a block from the house and was watching the approach of another night prowler coming down the avenue.

It was a familiar stride and there was a familiar flutter to the garments about the thin legs. Mace, smiling grimly, waited until the other was beside him for a tart:

"Hello, Bill Featherton!"

The lean attorney stopped with a jerk.

"You, Bob?"

"Yes!" The inventor linked his arm through the other's. "I want some legal advice free."

"You'll have to walk with me, then. I'm dead tired; I've been trying to shake up a better job than that title company thing and I want to get to bed."

"All right. Listen, then. Brittan's clerk stole those patent papers!"

"What?"

"And by Welling's orders, I think. Anyhow, they're in Welling's house at this minute, tucked under a corner of the rug, drawings and all. How am I going to get them back?"

"Is this something you've theorized?"

"It's something I know."

"How?"

"I have a friend in the house," Mace said briefly.

The lean attorney considered for two seconds.

"You're not going to get 'em back," he said.

"Do you mean to tell me that there is no way—"

"There are not less than five dozen ways, my son," said the lawyer. "One of them is to get the definite evidence against Welling, another is to have him jailed, and the other fifty-eight are—cold cash. Got it?"

"Seven dollars and some change!" Mace snapped. "Will that do it?"

"Seven hundred times as much might start the fun!"

"But "

"See here, Bob," Featherton said irritably, "I don't pretend to guess why you mixed up with Welling in the first place, and I have no notion of telling you the things I refused to tell you this afternoon. But this much I will say: if it is really true that he has had your patent stolen, you're done — absolutely done! Dale & Wilmer are that gentleman's attorneys!"

"I'm aware of that, but do they control the world?"

"All of it that their clients need if the clients have the price," Featherton smiled faintly. "I wouldn't hesitate to say that you may stir up what little trouble a poor man can—and by the time you were done with it Dale & Wilmer would have you in Sing Sing on one charge or another, with about a dozen other indictments waiting to be settled when you got out."

"Is it really as bad as that?" Mace asked gravely.

"It is. But—I can tell you this—"

Something like real animation came into the underfed lawyer's tone as he faced his friend, and while it did not die out of his expression, he seemed to think better of the words and cut them short.

"Go on!" said Mace. "You were going to say something helpful that time."

"I was going to say that if they were my drawings, Bob, I'd get 'em back!"

"Huh?"

"Yes, sir, *I'd get 'em back!*" The attorney halted at the corner and held out his hand. "I live a little way from here. For Heaven's sake be decent enough not to come with me and look at the place!" he said savagely. "Good night!"

He turned into the darker street and

stepped quickly away, and Mace stared after him with a meditative scowl. A soured, sensitive soul was Mr. Featherton, and of great assistance when one needed counsel. All things considered, if all his advice was of the brand vouchsafed Mace, that person reflected, it was small wonder that he enjoyed his present degree of prosperity.

He would get them back! The inventor laughed unpleasantly and looked about uncertainly. He, too, would get them back if well, by thunder! he'd get them back, *anyway!* It was quite a startling thought that came to him, there on the still corner; for a matter of five minutes he turned it over and over, breathing heavily. In the end he walked slowly toward the riverside park again for such calm meditation as the constabulary would permit him

After all, Featherton had hammered home some truths that were amplifying themselves rapidly. To-morrow there would be nothing to prevent Welling calling in an attorney and having a proper application prepared and in Washington before night—nothing under the sun that Mace could do! A week or a month, and despite all their penniless efforts, the patent would have been granted, and to a man with millions to defend his right to it and the shrewdest kind of counsel and the perfect ability to buy all he might need of the perjured testimony Featherton had suggested.

If, in short, Mr. Welling owned those plans when he awoke in the morning, the Mace-Darling rotary, as such, was simply a thing of the past. Messrs. Mace and Darling, with a joint capital of seventeen dollars and a quantity of small, second-hand shop machinery that would bring next to nothing at auction, would be at liberty to start life anew.

It was a time for emphatic action, and as a distant clock struck one Mr. Mace stepped out of the park, smiling! One way or the other, some one was going to be licked before daylight because, if an amateur could accomplish the feat, he would burglarize Mr. Welling's home! He might easily enough be caught in the act; from that vibrating possibility he turned away abruptly. There was also a chance that he would not be caught and that the square envelope was still under the corner of the library rug.

Now it is odd that, having resolved upon a flier at crime and all that it entailed, something akin to relief came to Mace. His step grew springy and alert once more; where he had shunned policemen an hour or two back, he elected to pass a word with the man who was making a second tour of Welling's block; and the casual comment on the continued cool over, he turned the corner whistling —and stopped

Here, at the corner house, the fence of the short back yard was beside the walk. Once over it and he would be at Welling's fence; and there was a gate here, by the way, and Mace tried it as cheerfully as if he had owned the premises. It opened as he turned the knob, and, with an upward glance as he stepped from the public street to somebody's back garden, faintly sweet with early blooms and the smell of moist earth. Instinct caused him to pause warily and look about. Out in the street a milk-wagon trotted past; somewhere at his feet a startled cat scuttled to safety—and all was still again and things were beginning to take shape in the gloom.

There was Welling's fence; there, too, was the roof of a little extension over his back-yard door. The inventor of the rotary considered it quite calmly and looked around again. Providentially, a kitchen chair defined itself not two yards from him; he tiptoed over and placed it beside the fence. He stepped up and steadied himself; the extension roof was no more than six inches above his head now, and squarely beside it stood a tall window.

A momentary gleeful chuckle and he had taken his grip and was straining his muscles. They were excellent muscles, and they drew Mr. Mace to the little square of painted tin without much effort and with no sound. On hands and knees he listened again; the powers of right were with him, for he had aroused nobody as yet.

And now for the job of breaking in and putting himself in line for striped clothing and all that went with it. Opening the ordinary window-catch with a pen-knife blade is no very difficult task; few people follow up-to-date styles in these details and the house was close to twenty years old. In all probability five minutes would serve to unlock the big

pane. Robert Mace gripped himself and, knife open, stepped close and squinted through the gloom at the lock inside.

Of all simple, unsafe types it was the simplest! A substantial hair-pin would have thrown it off; the strong little blade, sliding ever so deftly between sashes now, glided along to it and pushed and twisted a little and pushed again. In Mr. Welling's home the tiniest of clicks announced that nothing but an upward shove stood between Mace and an entry!

A brief pause, during which a lifetime of right-living rose suddenly and all but staggered the adventurer, and he shut his teeth and laid strong fingers on the sash. It rose quickly and silently, and a cold calm descended upon Mace. Right here and now, before taking that first inward step, he could withdraw from the risk and flee, to leave the rotary behind forever and, perhaps, reflect for the next fifty years that his nerve had failed at the one moment when it might have saved all. Robert Mace merely smiled and passed one leg over the sill; the other followed swiftly and he straightened up, every sense alert, in the still, rather airless interior.

It was a house of unusual breadth and this appeared to be the dining room; beyond, reflection from the front windows told that the entrance was at one side and that, in all likelihood, the library was situated at the other. Hands out, feet never raised from the thick carpeting, he passed across the room and almost chuckled. If this open door, this floating hint of cigar-smoke, this suggestion of a big table and big leather chairs, meant anything, he was in the library at this minute!

He paused and stooped. Even now he was on one corner of the rug and his fingers slid beneath it. Bare, polished floor met them, which meant nothing at all. There were still three corners to be examined, and perhaps he had best travel to them on hands and knees. Smiling excitedly, he fumbled ahead. Here was the second corner.

And somewhere else a board had creaked loudly!

The amateur burglar hitched upright and glared around, throat closing, head dizzy with the blood a nervous heart was pumping. That creak had been no mere night noise; somewhere in the building, and somewhere near at hand, a heavy body had moved and—if another body, which was his own, didn't move pretty rapidly daylight would come before he had examined all four corners.

Mr. Mace dropped lightly to his hands and knees once more and raised the second angle of the rug.

And by the doorway at the far end a metallic snap sounded and lights flashed up, and John Welling himself, massive in the long bath-robe, was training a heavy revolver on the uninvited guest!

CHAPTER VIII.

Indoors.

THE end of the adventure had arrived!

The very worst possible thing had happened at the worst possible moment; it was all over now and Mace at liberty to picture a future of no uncertain quality. If Welling wished him out of the way the means were all at hand now, and there was no doubt whatever in the inventor's mind that he would use them.

An extremely tense five seconds, then they faced one another, and Mace found himself saying:

"I—surrender!"

The promoter's lips curled in a very slight smile.

"That's an entirely unnecessary formality, Mace. This isn't war—this is plain crime."

"Well, I "

"Just take your hands away from your sides, young man. I'm an extremely good shot, but I don't want practise."

The coinventor obeyed, swallowing hard.

"Now stand up!"

That command, too, found prompt compliance in the white-cheeked younger man

"And now, with your hands right up in the air, walk over here and permit me to go over your pockets."

"I'm not armed!" Mace said bitterly.

"We'll take no chances," said Welling as he stepped forward, the pistol drawn back carefully and quite ready for action.

Swiftly the free hand passed over Mr. Mace and the other stood away again. Some ten silent seconds he surveyed the

visitor from top to toe, and sheer contempt gleamed in his eye as he said sharply:

"Sit down there, you damned jackass!"

Again Mace obeyed, dropping into one of the leather armed affairs from knees that were more than ready to relinquish their load for a little. The master of the house, pistol slipped into his side-pocket, sat down beside the table with a grunt of plain disgust.

Slowly the cold eyes traveled over the visitor again—took in each little detail, from the pallor that Mace could feel to the slight tremor of the nervous hands that he could not control; and in the end Welling permitted himself a small, contemptuous shrug and said simply:

"Well?"

"I have nothing to say!" Mace managed hoarsely.

"Willing to stand on present appearances, eh?"

"I—yes."

"And have me call in an officer and turn you over?"

The inventor was grimly silent.

"Well, you startled me with your mechanical ability at first sight, and I was not quite so much impressed at second sight, Mace; but I had no idea you were fool enough for this!"

Robert Mace winced

"What was the idea of it all?" Welling queried.

"You know that part well enough, at any rate!" Mace said bitterly.

"Well, upon my soul and honor, you may well thank your stars that I do!" Welling muttered. "Had it not been for the warning contrived by my too romantic niece, several times removed, do you know what would have happened?"

"No."

"Well, you'd be very dead at this minute, you scatter-brained young clown!" the master of the house said flatteringly "Twice in my life I've had to shoot in the dark—and I haven't missed on either occasion."

"Then—"

"And I may say, after that little note episode and—er—what Miss March confessed about it, that I was looking for you, rather. Gad!" The promoter shook his head almost in wonder. "I was young myself once upon a time, but I was never as young as all that!"

He broke off with a sour smile.

"You're quite a lady-killer, aren't you, Mace?" he suggested, after a still moment.

The inventor stiffened on the instant and flushed.

"See here, sir!" he cried hotly "We'll omit—"

Welling stopped him with an impatient wave of his hand.

"I understand. It shall be omitted," he said mockingly. "I fancied that you had made something of an impression on Dorothy, but that it was so profound or so — er — fearfully and wonderfully reciprocated I never dreamed. I—"

The inventor was on his feet -eyes blazing.

"That'll do, Welling!" he thundered. "You've got *me*, but that doesn't mean "

His fists were actually shaking at the other; and the other, with a smile of rather nasty quality, fairly eyed him into silence this time.

"You calm down, young man, and sit down again, or I'll take the liberty of bouncing the charming young woman. She'll be out of a job and without means or the way of finding another, and you'll be responsible!" The ugly sneer appeared again and Welling laughed outright. "That, unless your general expression is lying, seems to be sickening your very soul!"

"Well, you damned—" gulped the visitor

Rather startlingly, Welling's fist came down on the table! The mockery all left his voice and manner, too, and angry business took its place.

"Look here, Mace! Burglars don't threaten their victims this season—it's not good form. I don't want any more of that melodramatic mouthing from you! That girl, in actual fact, betrayed the confidence which I have reposed in her, and that it was in a matter of no importance has no real bearing on the case at all. If she wasn't a distant relative and absolutely dependent on me I'd have fired her out of this house and out of my employ an hour ago. As for you—"

Curiously, the tone bit into Robert Mace and steadied him. Some of the

fury died down and cooler judgment took its place.

"As for me," he said, "having stolen my patent and been detected in it, you're using Miss March and this situation as a club to—"

"I'm doing nothing of the sort, and we'll drop Miss March!" Welling snapped. "More than that, I haven't stolen your patent and I'm not particularly anxious to own it!"

"Eh?"

"And, still further, if you will step over and raise that corner of the rug - no, that one over there—you'll find your confounded papers, Mace!"

He sat back with a grunt and waited as the inventor crossed the room and, with a wary backward glance, turned back the corner of the heavy Oriental weave. And then, in spite of all, a queer little cry escaped him. It was there! A big envelope, although not the one that had contained the papers at his last sight of them, was flattened on the polished expanse. He snatched it up and opened it—and for the second time in a very few minutes his knees turned weak.

Here were the specifications laboriously drummed out by Henry Darling on the old typewriter. Here were the several superb bits of mechanical drawing that represented so much more of Darling's work! And Welling, over in his chair, was yawning!

"These—these seem to be—" Mace stammered.

"They're quite as they were, however that may have been," the master of the house said briefly. "I glanced through them when they first arrived that's all."

"Arrived from where?" the inventor asked pointedly.

A moment Welling's acid smile appeared.

"Upon my word, you don't deserve to know!" he muttered. "However—they were brought to me."

"By whom?"

"I don't know his name. Our acquaintance was very brief. I never saw the little scoundrel before."

"Little and young and dark?" escaped Mace.

"And several more things," Welling said, with another yawn. "He turned up here just as I came home this afternoon. He had these and spun a little tale about the thing having been invented by his deceased brother; he didn't understand machinery, but he was willing to sell it for a thousand dollars if it was worth that much."

"And—"

Welling's eyes twinkled dryly

"You'll hardly credit me with so noble an act, Mace," he said; "but in turning them over I saw that those specifications —some of them — were on paper engraved with your tastefully designed home address. I guessed the rest and asked him about it. He left without waiting to gather those up and take them along. You have the whole story, Mace."

"Oh, no, I haven't!" the inventor said quickly. "What were they doing under that rug? Why did you not -"

"Just a moment," said the master of the house, with rather forced calm. "No dastardly crime has been committed, I assure you. Item one, they were there because I could watch the spot from the door and see if Miss March was sufficiently interested — as I suspected — to steal in alone and make sure of their identity. She was. Item two, I didn't call my machine and immediately rush to your residence, young man, because I had several dozen other things to do. It will perhaps interest you to know that, unless the United States mails suspend overnight, you'll find a letter at your workshop to-morrow morning requesting you to call here in person and secure your treasures. And for the last item, I wanted to look through the thing so long as it happened to be here."

"Well?"

"It isn't worth a damn, Mace!" said the promoter, with meditative candor.

"But you sent Dryden —"

"Less feverish resonance in the tone, please," said the other. "There are several people asleep in this house, Mace, even if a keen acquaintance with the general character of fiery youth did keep me awake to greet you. I sent Dryden to offer you five thousand dollars."

"But not to mention that you had my patent?"

"He knew nothing about that. Did he make the offer?"

"He did!"

"And that extremely curt manner indicates a refusal on your part, eh? I

don't know the result of the interview, you know. Dryden is to report to me to-morrow morning at the office."

"I refused it!"

Interest in the whole affair was dying out in Welling's eyes; his faint smile held a quality of growing weariness.

"Honestly think the thing's worth more, eh?"

"I don't think anything about it. I *know*."

"No, you don't, Mace. There are half a dozen things about that engine that will take months of labor before they're in practical shape."

"Nevertheless, there is a complete rotary running in our shop—"

"Laboratory tests aren't worth a cuss —ever," Welling yawned. "I invented a perpetual-motion machine when I was nineteen, and it ran for six mouths, but it never made a penny for me. All the same, there is a basic principle in that machine of yours that may be worth something. I'm blessed if I know whether it is or not." The mightiness of the yawn all but overcame him. "Well —want the five thousand?"

"No!"

The master of the house stared at him with a sleepy grin of astonishment.

"Youngster," he said, "do you realize that you've broken into this house, led my trusted secretary from the path of business honesty by your — ah — manly beauty, invented an engine that is only a guess at a principle, and made an ass of yourself generally, and you're still refusing a young fortune in real money?"

"I—yes!" Mace said grimly.

"Well, you're a remarkable young man!" chuckled the promoter.

A new yawn came near to obliterating his hard countenance; and, watching it, a swirl of uncomfortable uncertainty came to Mace. Was he right or wrong? Was Welling actually talking hard common sense? His whole manner seemed to indicate it; the simple fact that he seemed to have no intention of calling the police and removing Mace in the easiest possible way pointed in the same direction. Was he making a downright fool of himself by refusing that five thousand dollars, which, with care, would start them on the two other new things they had in mind?

Or—the yawn came to an end and Robert Mace took a new grip on himself. He was *not* wrong! Those ridiculed laboratory tests, showing an invariable eighty-five per cent of efficiency and all the rest of it, were accurate and convincing as a good technical education could make them. The fact of the matter was that Welling, detected in his own crooked work, was taking the easiest way out and —

"Going to—prosecute me for breaking in here?" Mace found himself asking.

Welling looked at him in momentary amazement.

"Hardly," he said. "I've no time for police courts, Mace, believe me. Moreover, whatever your private opinion of me may be, I'm not inclined to put a jail stigma on a man merely because his mental processes are a little foggy."

"Then —Miss March—"

"Miss March will not suffer. And she will not repeat the trick, either!" Welling informed him from compressed lips as he arose. "And now, Mr. Mace, if there is nothing further to discuss, shall we say good night?"

"I am willing."

"For Heaven's sake, look at your stuff, though, and make sure that it's all there before you go. I don't want to be accused—"

Another yawn cut him short, and Mace's own lips tightened. Without comment, he slid the contents of the envelope to his knees and ran through them; to the last bit of paper it was complete. And he arose stiffly and said:

"It's all there, and—and thank you very much for overlooking the way I entered."

Welling nodded sleepily.

"You're welcome, I'm sure. We'll go down-stairs, Mace. I don't want to take down the locks on this upper door. Over this way."

He shuffled to the door in his slippers and switched on the light in the outer hall, pointing patiently to the basement stairs. He waited until Mace had reached the top of the landing and switched off the library illumination; and then, shuffling after again, he said:

"Straight down, Mace. There are no turns. Go ahead."

What was the sudden new note in his

voice? Mace caught it—or fancied he caught it—and turned to look back. Certainly there had been a crisp, keen intonation there which chimed not at all with the yawn of a moment before, and—*was* a descent into that black basement perfectly safe?

Half-way down he hesitated. Try as he would, he could not conquer it this premonition of evil, growing by the second as he contemplated the inky depths below. Nervous he might be or otherwise, but a dozen men might well be waiting down there to blackjack him or

he cursed himself and fumbled along the banister rail, envelope clutched tight under the other arm.

And then, without warning, just as he was within three or four steps of the bottom of the flight, the lights behind snapped out! On the stairs behind Welling was following. In the gloomy abyss below somebody coughed.

CHAPTER IX.

And Out Again.

THE human is as good as his nerves, and very little better. The trifling illness, as often as otherwise, turns to deadly disease through the solitary guidance of forces of the brain. Your neurotically jangled woman, catching the slight sound outdoors, constructs instantly a whole battalion of burglars—and for all practical purposes of the moment they are perfectly real.

For the instant, then, that cough in the gloom spelled sudden and certain death for tired Robert Mace!

It was a big cough—the cough of a big man in a space that should have held no man at all. It was followed by a stillness even more significant; and, having grasped its terrific significance, Mace grasped his wits and returned to something like calm.

If he had been trapped hysterics were not going to help matters. Neither was the briefly contemplated shout for help going to aid him in the least; it might, indeed, bring down a waiting club a little bit ahead of time. Calm was the thing, and he bent low in the blackness and tried to say quietly:

"What happened?"

"Lights went out," Welling said, rather unnecessarily, and it seemed that the distance between them had lengthened.

"But—"

"Fuse-plug, probably," snapped the master of the house. "Go on down You'll be able to feel your way."

"If you'll give me a match—"

"I haven't any, and don't light any of your own, by the way. There are several fuzzy curtains down there somewhere, and I don't want—are you at the bottom, Mace?"

"Not yet."

"Go ahead, then, and I'll be with you in a second or two."

The voice ceased, and to the best of Mace's judgment Welling was not in motion—or, if in motion, traveling with an intentional absence of sound. Below, some one seemed to shuffle, and if the sound did not come from the actual side of the banister it was within two feet.

A stifled gasp and the inventor of the rotary bent lower—waited an instant for the swish of a weapon through the space he had just occupied—found that it was not coming, and stepped suddenly to the level flooring of the bottom story.

There is a certain comfort in firm ground under one's feet. It came to Mace, and with it the additional cheering thought that if he could not see the other fellow down here the other fellow could not see him! It was even possible that, with speed and care, he might make his way to the door and escape before the contemplated assault could take place!

He looked about blankly and decided upon his direction. He plunged forward—and the plunge brought a sharp gasp from the gloom and sent Mace recoiling! He had collided with a man, and a very substantial one.

And now the gentleman had a very clear idea of his own location and there was going to be a battle; and since the offensive party very frequently holds his advantage throughout a conflict, Robert Mace hastened matters a little by darting lightly back toward the spot he had just left, and, right fist clenched hard, driving it into the gloom with all his might!

The result was instantaneous. A little shout—angry and deep and threatening—and something fairly whizzed by his head. A button passed his cheek and

the swift brush of a sleeve, and with an excited little laugh Mace had ducked low and doubled the fist again.

It came up with lightning speed and struck—nothing. But there was a sharp shuffle just to the right, and he wheeled toward it and side-stepped, this time to miss by the barest fragment of an inch a second blow from the unseen one. The fight was on, and since the last doubt as to its being a fight had been dispelled, Mace resolved that the battle should be a worthy one!

Always athletic, abnormal strength surged up in him. Spring-steel eagerness tingled in his muscles. There might be one of them or there might be a dozen, and the end very likely was in small doubt; but, until they finished him, Welling's nicely planted ruffians were going to suffer all that Robert Mace could inflict!

He swung viciously; he was rewarded by a shotlike report of the impact and a scream as his knuckles met an invisible jaw-bone. He laughed aloud and swung again and for a little the tide of battle changed. A fist quite as hard as his own struck his chest with the force of a battering-ram and Mace sprawled crazily on the flat of his back, slid for a yard, felt his head strike a surbase, and, on the instant, crumpled into a tense, defensive ball against the wall

Somewhere Welling was calling excitedly. Mace's brain, dazed for the moment, could not piece the words together. He tried, as invisible shapes moved about him—and another thought came. His patent! He had dropped it in the fall and now—why, it was all perfectly clear now! He had been brought down here for just this purpose; when the lights went up there would be no envelope in sight. Panting, he sprawled forward in the gloom and sent both hands sweeping over the floor, and then, with a gasp, he sat up once more. He had found it!

There was no doubt about that fact. His fingers, running quickly over the thing, identified the envelope as his own. Twitching, they tore a corner, and the twitch was a veritable inspiration to Robert Mace.

It was entirely possible that, fifteen seconds hence, he would have been located and knocked senseless, and there was no plain way of avoiding that. But if they reckoned on gaining his beloved drawings by the act well, there was a way of avoiding *that*, at least. A small, wild laugh left that portion of the lower hall occupied by Robert Mace; crouching, his strong fingers gripped the envelope and tore it across—and across again and again, and even again, until the fragments were no more than an inch square. A gulp, and he stuffed them into his pockets and laughed once more.

Welling might have grasped details enough to have an expert duplicate the engine. Welling might go through to the end with the villainy he had obviously intended. But if there was to be such a race for the patent office the firm of Mace & Darling would start off with a big lead! Even at this minute—

"*What the devil is the matter down there?*" demanded Welling.

A light snapped into life just above Mace's head. Two yards away a big man in livery, holding his jaw just now, looked around wildly as he said:

"God bless my soul, sir! I—I don't know! Is the—the person here a burglar or "

Down the stairs Welling was shuffling rapidly, his face white with rage. An awful suspicion overwhelmed Mace for a moment. Had he again erred in judgment—had his tired brain magnified a trifling accident into a wholesale scheme for his undoing? It certainly seemed so. Welling, looking him over once more, trembled with an honest fury that could not well be simulated as he cried:

"*What is it?* What on earth was the matter?"

"Well, I—" Mace stammered.

The man in livery glared at him.

"I will say this, sir," he said firmly, "he struck me most violent in the dark, sir, with no more provocation than you're giving me at this minute!"

"Struck you?"

"He did indeed, sir, and I may say —"

"What were you doing down here, anyhow, Thomson?" the master demanded wrathfully

The liveried man indicated a chair and a little table at the far side of the corridor with one large, shaky hand.

"Begging pardon, sir, I must have put my head down there and fell asleep," he submitted. "William was out, sir, and

I had a notion to wait up and attend to the locks myself. He must have passed me in the dark and—"

"All right. I understand!" Welling snapped. And then his savage eyes turned on Mace. "What's the matter with you?" he inquired pleasantly. "Are you a plain fool or actually a lunatic?"

"I—"

"Where's your envelope?"

"Torn up, and the pieces are in my pocket!" Mr. Mace cried somewhat wildly. "And if you thought you'd get it by—"

He could go no further. There was an expression on Welling's hard features which indicated that complete loss of self-control was a matter of just one more small provocation. Silently the master of the house turned on another of the lights and himself stepped to the lower door and opened it.

"Get out of here, Mace, before I have you thrown out!" he said. "And don't turn up again!"

The inventor of the rotary stumbled toward the door and the outer air.

"I have no intention of turning up again!" he said thickly.

"And that impolite request refers to the office as well as this house," concluded the master of both. "I've seen idiots, young and old, but of all I ever saw the palm goes to you, Mace, and—get out of here!"

He stood back and the unwelcome guest noted that the tremor had not subsided, that there was something about it now which suggested that Welling's fingers were itching to clutch him! With an inarticulate rumble in his throat, Mace stepped outward and to the gate which Welling snatched open, and through it. The gate slammed violently on his heels; an instant and the door slammed as well—and he who had entered the house by the dining-room window a little after one o'clock was standing in front of the same house a little before two, free and with his patent, in whatever shape!

It had indeed been a lively night for Robert Mace! Now it had bounded to a finish—and he was devoutly thankful that the finish found him alive and out of jail. An upward stare at the third-floor window told him nothing; the sash was still closed and no sign of life showed behind it. One tremulous sigh escaped Mace and he headed for the corner and where?

The workshop was probably his best goal. Henry Darling would have to finish up his new plans quite according to arrangement, but the crying need for haste had passed. He would drag Henry away from the drawing-board and, on the two little cots behind the curtained end of the loft, they could still snatch a few hours of slumber from the night.

And for his own part, now that the trouble was over, Mace's need of sleep was growing acute. One night in the garage, a day of stress, and another night of greater tension had done their worst to a man accustomed to his full eight hours; he fairly ached from head to foot as he looked for a car, found none in sight, and set off to trudge his way to the little loft.

The burning light on the top floor proclaimed Henry Darling's faithful application to his task. On the steps the watchman slumbered comfortably through his hours of duty, and Mace passed him, too tired even to smile, and climbed to the altitudes above.

There were rings under Darling's eyes when he looked up, and the lids drooped; but the drooping ceased quickly enough at Mace's cheery:

"Time to quit! I've got 'em back!"

"What?"

"Yep! I'm not going to tell you about it to-night, Hen—there's too much of it. But I burglarized Welling's—met him—had a long talk—oh, did a thousand other things, and ended up with a fight in the dark."

"Well, Bob—" Darling began solicitously as he rose stiffly and crossed to his old friend

"It's all right. I'm not insane, although I've been accused of that, too, this evening." Mace grinned wearily "I had a brainstorm and tore up the papers and drawings and everything else. Here they are!"

He reached into his pocket and produced a handful of fragments; he grinned again as Darling took them and stared at them.

"Henry," he said, "I am all in!"

"You look it," agreed his partner. "But these—these—"

"They're all that's mortal of your dandy little plans, old man, and it doesn't

matter a particle now, I assure you. It's only a matter of a week to finish a new set, and we'll sell something, if we have to, to retain the best law firm in town after that. The great thing is that I got 'em back, even if they're in powder."

He stretched his legs and indulged in a mighty yawn; weakly he felt for the pipe and, failing to find it at the first effort, permitted the arm to drop limply over the arm of his chair and hang there. Henry Darling, with customary gravity, walked back to his drawing-board and the light and sat down with a thud. Before him dozens of paper fragments were strewed, and he looked at them stupidly —all that remained of his infinitely skilful drafting. A jerky little sigh left him and he bent over them and fingered them affectionately. In his chair, Mace's eyes closed slowly and the legs sprawled; Mace's neck, usually a stiff member, turned slowly to putty; his head rolled over aimlessly, and—

"Bob!"

"Hey? Yes? What?" The head came up again.

"What did you say this torn-up stuff was?" Darling demanded sharply.

"Eh?" Mace scowled his way back to full consciousness. "Our patent application, of course, and what the dickens is the matter with you, Henry?"

"Nothing. But there isn't a scrap of drawing paper here!"

"Huh?" The dapper member's eyes blinked impatiently. "It's there somewhere."

"I don't believe it! And all this typewritten stuff—I've been piecing it together, Bob, and it has nothing to do with our patent!"

This time Robert Mace sat bolt upright. His partner in the unusual rotary nodded emphatically.

"It seems to be nothing but details of some suburban property!" said Darling.

CHAPTER X.

The Larger Grip.

THE filmy, elusive, lurking quality of a really pretty dream is its chiefest charm. Such a one had been in full possession of Mace's subconscious self; it involved Dorothy March leaning, as he had never seen her lean, on a stile somewhere in the country—which also he never remembered viewing; and to be dragged away bodily in this fashion—

"What are you talking about, Henry?" he demanded angrily.

"All this torn-up junk you've brought home! It's not our patent or anything like our patent. It has no more connection—"

"Let me see that stuff!" cried Mr. Mace as he staggered to his feet and crossed the loft.

"Here it is—here! See here!" Darling's finger pointed to a collection of half a dozen bits neatly laid together just now. "'—from a point 142 feet east of highway, extending to—'"

"That's right!" gasped the dapper member of the firm.

"And here again— '— plots on avenues and cross-streets in Section E, restricted to residential pur –' Here's another lot of 'em, Bob. See?"

Mace nodded swiftly.

"I see it! '— voted to set aside $200,000 for initial building of station on premises and clubhouse, and $150,000 additional to pave throughout with asphalt or such other paving as may—'"

His voice choked.

"Well, what *is* this stuff, anyway?" asked Darling once more.

"What is it? How the devil do I know what it is?" Mace cried, and one hand clutched his dazed brow for a moment. "Ten seconds before I tore it up it was our patent, complete, Henry, and I thought they were trying to get it away from me there in the dark, and—"

He stopped again and his eyes bulged as they rested upon Darling, and when words returned to the adventurer they came in a frenzied howl!

"And, what's more, they *did* get it away from me!" he shrieked. "The whole thing was arranged beforehand, just as I thought at the time—the fight and all the rest of it! That jailbird in the livery was waiting to knock me out and Welling was waiting to slip this other thing to me!"

"I don't understand "

"I know that, Henry, and I can't stop to explain now!" thundered Mace. "*That* was why he put it in one of his own envelopes! That was why—what did I do with that hat?"

"You're not going out again?"

Mace laughed wildly.

"I'm not, eh? Well, I am, Hen, and the chances are I won't be back for a while!"

"Why?"

"Because I'm going to make one more trip to Welling's to-night, my boy, and this time I'm going to get that patent if I have to tear down the house and pick over the bricks to find it!"

"You're crazy!"

"That's what Welling said, the damned scoundrel!" shouted Mr. Mace as he snatched up his hat. "But, all the same, I'll get that patent now or I'll be on a slab in the morgue by breakfast-time, believe me! Good night, Henry! Maybe it's good-by! I don't know and I don't care much. So-long—"

He pounded over to the door, panting a rage that passed anything he had ever known before. He dragged at the knob as if bent upon tearing the door out bodily, while Darling watched him with open mouth and strove for restraining words

And the telephone rang merrily!

Coming at that hour of the morning, the sound gave pause to the furious young man by the door. He shut his teeth and waited while Darling picked up the instrument—answered—started, and then looked up to say:

"Somebody wants to talk to you, Bob." He nodded almost scared assurance to the instrument. "He's here," he stated. "Right here now—yes, he is coming to the telephone at this instant."

He passed the thing to Mace, and that gentleman managed a fairly calm:

"Hello! Who is it?"

At the other end of the line he caught a whistling intake of breath

"Mace, is that you?" inquired Welling's vibrating tones.

"Yes, and is that *you*, you—"

"Be quiet, you fool!" came through the instrument in a snarl so vicious that Mace's eyes opened. "Have you thrown away what you tore up?"

"No!"

"None of it?"

"No."

"Are you sure?"

"Very sure indeed!" Mace cried savagely. "And—"

"That's enough! Dispense with your beastly hysterics until I've finished with you, in Heaven's name!" said the voice, with a bitter snap. "Do you know what you've done this time?"

"I—"

"You must have left your infernal papers here on my desk and picked up the whole collection of data I had on the Welmere Estates—papers that are absolutely priceless, because they'll have to be used to-morrow and they can't be duplicated without weeks of work!"

"I—" Mace began again.

"Never mind!" A little groan greeted him this time. "You're positive that you haven't lost a scrap?"

"Certainly!"

"Put all the pieces in an envelope and seal it carefully, so that none of them can possibly slide out. Do you understand?"

"Of course, I understand! I—"

"And then wait exactly where you are, in your own shop! Don't even try to walk to the curb with that stuff in your possession, do you hear? My car is coming for you. Get that?"

"Yes!"

"It will be there inside of four minutes, I think. And Mace—one thing more! Are you listening?"

"I am."

"It's going to take me from now to the minute of a certain conference to paste those bits together. If there is so much as one of them missing I'll have you in Sing Sing on a burglary charge—and if the limit of the law is too narrow I'll have the law changed to keep you where you belong for the rest of your natural life!"

The line closed with a bang, and Robert Mace turned away from his own end of it with heightened color.

"Give me one of the big envelopes, Henry!" he ordered gruffly.

"What is it now?"

"I—guess I've made another m[illegible] I don't know. Welling s[illegible]ent is safe in his house and [illegible]er —something else."

"And we can get it back: Darling cried joyfully.

Robert Mace gave vent to a quivering sigh as he licked the flap of a well-stuffed envelope.

"I'm going to get it back now," he said faintly. "At least, that's what I

gleaned from Welling. I—may go around to the house and turn in afterward, Henry. I—don't know. You'd better get some sleep and go right ahead with those drawings, I think. Good-by!"

He shook his head as if to free the poor brain from its maze of tangled impressions and started down through the empty building again. The watchman, clearing his throat, was staring severely at the big car whose horn had just roused him; and in the car a clean-cut little fellow beckoned Mace and cried:

"You're Mr. Mace?"

"Yes".

"Will you please hop right in, sir?" the other asked eagerly. "The boss gave it to me straight that I'd have no job if you weren't there inside of ten minutes."

He swung open the door of the tonneau and slammed it again before Mace could stand erect on the flooring; the fraction of a second he waited for Mace to bend toward the seat—and the car was backing around and pointing in the direction from which it had arrived; and now, as Mace plunged into the upholstery, gasping, it whistled toward the corner and around it!

It was the second time in twenty-four hours that he had been in contact with that particular green automobile. He rubbed his eyes and then bent before the wind as they turned into the avenue and roared up-town; there were many fine details in his mind about this latest twist which refused to dovetail. Also, there was a supreme quality of weariness in the mind that would allow him to do no more than lean forward and hope dumbly that nothing smashed before their arrival.

A final twist and they were at the curb, and Mace sat up slowly. It was Welling's home once more, and they must have reached it at a sixty-mile clip. He set his teeth and prepared to step out and [illegible] her interview in that libra[illegible] e did so the door of the house [illegible] and Welling emerged.

He was fully dressed, even to light overcoat and hat, and he carried a small grip. Straight down the steps he came to the curb, and yanked open the door of the car, to enter, and snap:

"It must have been packed in the larger grip!"

"Eh?"

"The envelope—the envelope that I supposed contained my papers until Miss March informed me that the one she put in was not sealed, while—let me see those scraps, Mace!"

He snatched them and, tearing the envelope, picked out a single bit of typewritten matter. Shaking, he held it close to his eyes in the first grayish light of approaching dawn—and a wicked little yelp came from Mr. Welling!

"You've done it! You've done exactly what I feared and—the dock, George!"

The car bounced into motion and Mace, galvanized, laid a sudden hand on the arm of the other as he cried:

"What dock?"

"Mine!" snapped the promoter. "You'll have to come aboard and get your trash—or shall I throw it overboard?"

"Aboard what?"

The promoter controlled himself with an effort.

"It's difficult to speak calmly to you, Mace!" he said between his teeth. "I—your papers have been packed in the larger of two grips, which has gone aboard my yacht, just now in the Hudson. I am about to start on her for Boston, with the forlorn hope of getting a few hours of peace on the way. If you want your beastly documents it will be necessary for you to come aboard with me and get them. Do you quite grasp the situation and do you wish to come?"

"I grasp it, and I'll come!" Mace snapped.

Up-town again the car was whistling its way. It passed through a region of tall apartment houses for many blocks; it wheeled to the west again and raced for the river; and there, with a snarl, Welling leaped out, dragged the small grip after him, and left Mace to follow.

He did it with alacrity, to find himself beside the larger man on a little dock lit with an incandescent here and there. In the dark water bobbed a rowboat with a single oarsman, and into the boat Welling stepped sure-footedly, with a barked:

"You'll have to bring this man back to shore in a few minute, Parker. Get in, Mace!"

The coinventor followed silently. The oars dipped and Mace drew breath and hunched up on one of the cross seats That Welling owned a yacht was news, although not very remarkable news, since Welling was able to afford luxuries. And if that racy-looking craft out there happened to be the yacht she was very much the real thing, too! His admiration grew as he studied her through the gloom. Without funnels, evidently gasoline-propelled, she must have been close to a hundred feet on the water-line, and she was a beauty. In the gleam of her very few lights bits of brass glittered faintly; white sides began to show through the thin mist, and Mace sighed with a suggestion of envy and a stronger suggestion of sheepishness.

He had accused the owner of *that* boat of stealing his patent! And now the owner was stepping to the little landing-stage at the bottom of the ladder, gripping the rail and climbing upward. Robert Mace followed again, this time to the dusky deck, and he found an impatient finger tapping his shoulder as Welling said:

"In this way. Follow me, and be good enough not to make any more noise than necessary. I have a guest on board, and he's sleeping just now."

Through a passage and into an unlighted saloon, across it and down another tiny passage to the single door at the rear, and Welling had switched on an incandescent in what might well have been the prettiest little owner's cabin afloat. Panels gleamed faintly, cushioned wicker furniture invited one; there was a mighty brass bed at the far side, and at the other, beneath the ports, a broad couch, deep and luxurious as to upholstery. Welling, with a glance at the other, indicated it and snapped:

"Sit down there, Mace!" He looked around and growled softly. "They haven't brought the bag in here, but—" He turned and transfixed the inventor with an eye that nevertheless seemed to contain the hint of a twinkle. "My grip is somewhere forward, Mace. I shall have to find it and get into it. Meanwhile, I wish you to remain here! Can you do that?"

"Yes!" the inventor said briefly.

"And if I'm not back in a full fifteen minutes will you kindly fail to deduce that some one is about to torpedo the yacht for the sole purpose of killing you? I want you right there and I don't want any hysterical dashing about — understand? There is a man on board tonight with a nicely balanced temper and more money than I ever expect to make. If one of your cyclonic spasms happened to break his rest it might easily cost me a great deal of cold cash. Stay there!"

He nodded and stepped lightly out of the cabin. The door closed very quietly and the latch clicked—and despite himself Robert Mace smiled faintly.

His aching eyes looked about slowly, to catch his reflection in the mirror, and Mace started. He had known that mortal weariness was dragging at his bones, but he had not suspected that he looked as badly as that! Why, that individual in the silvered glass might have been drawn through the proverbial knot-hole and then worked back and forth several additional times. He looked just about as he felt —on the verge of collapse.

And the couch —what a couch it was! He patted it affectionately and smiled; he relaxed and leaned on one elbow; and, since that is rather an uncomfortable position, he let his weary cranium drop to the alluring cushions. Further, he sighed; and since, according to instructions, he could please Welling most by remaining utterly inactive, Robert Mace glanced toward the door, smiled, and stretched out at full length.

Some time or other, when wealth came his way, he would find out just what firm had made this couch and give them *carte blanche* to contrive its duplicate for himself. Why, he could hardly keep his heavy lids open on the thing! And, as a matter of fact, there was no need to keep them open, since he must hear Welling approach.

Rather distantly an automobile engine whirred into activity, and Mace smiled again. Somewhere, recently, he had had something to do with an automobile—but the impression was very vague.

CHAPTER XI.

Where?

IT is pleasant to drift slowly out of sound, restful slumber and, not yet half conscious, to find the cool wind

puffing lightly over one's face. That is what Mace did, and he experienced a certain undefined astonishment that started the first of a new day's thought processes.

Last night one of the season's first hot days had been in promise; this morning the wind in the loft was downright chilly. He sniffed it, half in dreamland, half out of it, and felt further faint surprise. There was a salt suggestion to that wind which rarely reached them, and Mace frowned in his half-state. That was a sea wind, straight off the water, and nothing else!

And there was motion to this couch, a long, slow, pleasant rolling motion and a humming, vibrating impression that came from machinery and Robert Mace sat bolt upright, with both eyes open! Three long seconds he was utterly incapable of further motion, as the eyes traveled around the beautiful little cabin. Sun was streaming in at the ports; the roll was the long swell of the calm, open ocean!

And at the fourth second Mace turned with an involuntary, trancelike speed and stared out. Somewhere else on the boat one might be able to see land but there was nothing but glaring water visible from this porthole!

Just another moment he stared at it, and he had whirled around on his feet and with hands waving senselessly and headed straight for the door. And having headed for it, an invisible bar went up before Mace and he stopped short in the center of the cabin, one thought standing out in his brain with photographic definition: wherever he might be just now, he had landed there through a series of frenzied plunges, physical and mental! The one that took him through that little mahogany door might well hold the worst surprise of all!

Mr. Mace, therefore, gulped down his unbounded amazement and, on legs that would not yet take kindly to the motion, reeled back to his couch and for just a little space sat with silent, moving lips, turning over and over the question of what had happened *now?*

For a first conclusion, sheer exhaustion had put him to sleep five minutes after striking the couch. The second conclusion brought a grim smile to Mace's lips; that drop into slumberland had, in all probability, saved him a most emphatic whack on the head! There was nothing accidental about his presence here; Welling had kidnaped him, and once aboard he would have remained there, unresisting or otherwise.

Yes, Welling had put him out of the way, and Welling was quite free to take his rotary engine and put it to his own uses, or—Robert Mace's head dropped to his hands. *Was* the supposition not ridiculous? But if one considered it so, just why had he been left here in Welling's cabin while the yacht went straight out to sea?

Or was the promoter, after all, merely a thoroughly good sort, who, realizing the younger man's utter exhaustion, had merely left him as he slept, turned out the light, and himself bunked somewhere else? It was a far-fetched theory, perhaps; yet it seemed as good as any other. Although certainly Welling had not extinguished the light, for the filament glowed faintly in the bright room. And he had not touched the grip he brought on board last night, presumably holding his intimate personal possessions. Mace poked at it with his foot, and, since it moved so easily, reached out weak fingers and lifted it. The grip might have contained one collar; even that, if present, refused to rattle about the light emptiness!

Small though the detail, it held a wonderful quality of conviction. Bag torn envelope—automobile dash, and all the rest of them, were in the same class! They had been no more than incidents in the staging of Welling's effective little drama; and now, having planned with a keenness and ingenuity worthy of better things, he had Mr. Mace safely at sea. That was the whole story.

The gentleman most concerned could no more than groan and listen to the distant engines as he sought to formulate plans for the betterment of a situation obviously hopeless. They were engines with the powerful, steady vibration of a heavy gasoline plant, wholly unlike the shudder of steam, and running now at high speed; they had brought him—where?

The couch offered no solution. Mace rose again and started cautiously for the door, and paused again, for a new realization was creeping over him. This

cabin, if it indicated the condition of the rest of the boat, was rather an odd place, after all, to be found in a wealthy man's private yacht! Beautifully finished it was, beyond question, but a dozen little details appeared now that he had failed to observe in the artificial light.

The varnish on the woodwork, for example, originally a very high polish, had cracked and blued to a forlorn, disreputable finish. Mace examined it critically and guessed that no interested eye had noted its condition for three years, at the least. The floor, not merely neglected, was positively black with dirt, too! Footprints showed here and there, covered in turn with a new layer of grime and almost obliterated; and the mirror, which had seemed misty to his sleepy eyes, appeared even more foggy this morning. He walked over and examined it with lively curiosity, and his eyes narrowed. There were fingermarks here and dust; there were unhappy flies who had died long ago and never been disturbed, and the white enamel of the shelf just below was a rich, dusty gray!

What could it mean? Had this general neglect been visible last night, or had he—had he been playing some sort of Rip Van Winkle trick and sleeping in here for years, while the yacht went about its routine? Or — Mace blinked rapidly and crossed to the bed. His eyes were telling no falsehoods. That downturned sheet at the top bore the brilliant yellow of linen years and years after its last laundry visit! He fairly clawed at it and turned it back; the inner portion, the lower sheet, too, lacked the golden tone, but a long, long time had passed since any one had disturbed them!

So that he was not only at sea, but — Mace could stand it no longer! He crossed to the door again and listened. If any one were waiting for him beyond they gave no sign. He turned the knob and found it locked fast. He peered at the substantial brass bolt and laid violent hands on the knob, and at the first terrific tug the nosing of the bolt came free and the door swung back, to leave him tense and ready for—nothing at all!

The little passage was empty; so, evidently, was the saloon beyond the swinging glass door at its other end. He braced himself and tiptoed to the latter, looking keenly into the farther room. At either side were what seemed to be two stateroom doors; beyond, a little companion stairway down which he had come last night; and, with a stifled gasp of relief that no immediate objection was to be offered to his leaving the disreputable cabin, he stepped through the door.

A draft of brisk air came from the companionway for an instant; Mace sniffed it and considered the saloon with a funny little creepy feeling. At the best, he was not quite in the hands of friends here; there lurked about that very quiet saloon an ominous air beyond his power to define. But it was pregnant with possibilities, and he longed for the open deck, whatever it might bring.

Experience was teaching Robert Mace a certain amount of caution; he crossed the saloon on tiptoe, by way of leaving undisturbed whoever might be beyond those four closed doors, and, one hand on the rail of the forward companion stairs, he halted again for reflection.

Up to the moment violent methods had landed him worse than nowhere. Looking back over the past day or two, each new move seemed to have driven him deeper into trouble. Just what he could accomplish now in the way of getting out of this incredible mess and back to the rescue of his rotary engine there was no telling; but utter calm would have to be the first principle in working it out. One lively, fistic dart out on that deck above and John Welling might summon a pair of neat, white sailors, if they kept such things on the decayed boat, and have him dropped overboard! With a smile little less than ghastly in its quiet, Mace climbed the steps, emerged upon deck, and looked around.

His heart sank a little with the first glance. Ahead to either side there was no land. He brought out his watch and consulted. It was running still and indicated a few minutes before ten. This bounding, vibrating little vessel was swirling ahead at a clip never less than twenty miles to the hour—and it had been traveling, for all he knew to the contrary, since about three that morning!

A minute or so and the strong salt wind seemed to freshen him. He stepped into full view and looked around —and for the moment the yacht seemed

to have himself as its sole human cargo. There was a little wheel-house ahead, of which he could see only the back; there was a mast beside him from which no flag fluttered; there were very narrow little decks at either side, and he was about to turn aft and investigate when the door of the wheel-house swung open and caused him, for no obvious reason, to flatten himself against the wall and tighten every muscle for conflict!

The figure that stepped out and paused for a moment on the little ladder to the deck was far from startling at first glance, however. It was a man of medium height, clad in fluttering overcoat and soft felt hat, who spoke to some one inside the wheel house, shrugged his shoulders, and, stepping to the deck, walked in Mace's direction

Nearer inspection of him was less reassuring. He was extremely dark, and his general air suggested the continent rather than anything American; his raven mustaches were carefully tended, and the eye he turned, quite without astonishment, on Mr. Mace jarred that gentleman. It was a very dark, very mean eye; it was the sort of eye that hints at a very broad construction of man-made laws and a capability for creating fresh ones to suit an occasion. It was the sort of eye which Robert Mace fancied would belong to a cold-blooded murderer, and despite this pleasing bit of imagination he straightened up and asked quite evenly:

"Pardon me, but—but whose vessel is this?"

The stranger smiled quickly and said words which meant nothing at all!

"Well, I don't understand that, you know," said the inventor of the rotary. "I guess you'll have to talk English. Is—Welling around?"

The quick smile came again, brilliant and apologetic; its wearer poured a rather musical torrent of language in Mace's direction — shrugged his shoulders—pointed aft and smiled again, nodding the while — removed his hat and bowed most courteously — and hurried aft!

The dazed passenger started after him and changed his mind with the first step. *Who was this?* On second thought he looked important enough to be a nobleman, but—of what kind? Was he Italian or Spanish? The "*signor*" or "*señor*" he had used hinted at one or the other; the rest of his polite words might as well have been Chinese. Robert Mace, cursing the day he cut the living languages from his course, stepped to the rail and stared aft

Wicker armchairs were visible on the after-deck—three of them, at least, and those three occupied now, because the mystery was just wrapping his coat around him and sitting down. For the other two there was a thick-set, rather light-haired man, who boasted a wicked scar from ear to jaw-point on the visible right side and a sharp squint that was far from engaging, and a darker man, who might have been Italian or American or almost anything else. The third member addressed the mystery, who spoke freely, smiling the while, and the third member turned and appeared to translate to the scarred man, for the latter grinned and nodded and pointed significantly over the starboard rail. The mystery wagged his head in quick comprehension and just there Robert Mace turned away. From that little trio no subtle, benevolent reassurance radiated! They were at best queer, and his very soul yearned for the conventional.

Hat jammed down a little tighter, he walked forward for a glance into the wheel-house—and within a matter of five seconds his eyes were meeting a very keen, blue pair, and a hard little knot of a man in cap and coat that suggested an officer's uniform was shouting:

"Morning!"

The inventor of the rotary fairly thrilled at the word; here was a man who talked with a Christian tongue, at any rate, and Mace, making for the ladder, opened the door, and poking his head inward, came to the point with a crash!

"Where's Welling?"

The gentleman of the wheel-house—wheelless, since there was no more than a binnacle and an electric switch before its occupant—glanced up with no emotion.

"Who?"

"John Welling! I want—"

"I guess he didn't come aboard." The other shook his head. "Say, who was it laid out this steering idea in the first place?"

"*What?*" Mr. Mace stared his amazement. "How the devil do I know?"

"There's no need getting excited about it," the other said calmly. "I thought you knew all about the boat?"

"I never saw the thing before! I—"

"Well, he oughter got a prize for it!" said the other, stretching comfortably and grinning. "When I looked at that thing first I says—"

"Never mind what you said! Where's Welling?" demanded Mace.

The yawn ended abruptly and the other stared at him.

"I dunno How should I know? Who is he?"

"He's the man I came aboard with last night, and—"

"Well, *he* didn't sail with us. You know that as well as I do!" the man of the pilot-house said blankly.

"He didn't sail? Then—then—what vessel is this, anyway? Where is she bound for? Why—"

The seafaring gentleman's lips had drawn tight; his hard blue eyes studied Mace with quick, uncomprehending suspicion and the hint of a sneer, and he asked:

"What's got *you?*"

"I—what is this vessel?" Mace choked.

"Yacht Aletia!" said the other, with a curious smile. "Ain't it lettered on everything in sight?"

"That doesn't mean anything to *me!* What am I doing here? When—"

The other hitched about suddenly and, one elbow on the table, looked straight into Mace's eye as he said:

"Look here, you! I don't get it—I have no idea what this is all about. I suppose you've got a bad dose of cold feet, as a matter of fact, but "

"About what?"

"About your job here! But I want to tell you one thing: I'm in command here, and if you'd ever sailed with me before you'd know I don't like queer little jokes, young feller. You're here of your own accord and—"

"I'm nothing of the sort!"

"What?"

"I'm here because I was kidnaped, and "

Mr. Mace stepped back to the firmer deck. The gentleman of the wheel-house had risen, and while he glared amazement there was an angry suggestion about him even that hinted at possible attack. On the bottom step of the ladder he paused and, hands on hips, shouted:

"You come aboard last night with the owner's agent, didn't you?"

"I came aboard "

"You come aboard here about twenty minutes after your wife did and "

"My—*what?*" shrieked Robert Mace.

"Your wife!" thundered the commander of the Aletia. "What'n hell are you standing there gaping about? Didn't you—" His eyes had wandered to the companion stairs, and he broke off suddenly and touched his cap and smiled faintly. "There she is now, you—"

He choked back an evident flood of exasperated abuse and turned to his little glass-walled domain again. Mace, devoid of breath, found himself staring at the companionway; and then, as the momentary haze left his eyes, a thunderstruck little cry left him.

There—fresher, sweeter, prettier than ever, smiling, too, in the most matter-of-fact manner possible—stood Dorothy March!

CHAPTER XII.

Reasons.

WHATEVER wealth of imagination might curse Robert Mace, nothing of the sort troubled the commander of the Aletia. A snatch of song floated back from the little wheel house as the inventor, incapable of motion, stared and still stared at the figure by the companion stairs.

For the moment her smiling gaze had wandered seaward; she was sniffing the sharp air with plain enjoyment—*and there was not one thing about her to suggest surprise at the situation!* It was that last consideration which all but sent Mace swooning!

Men are caught in railroad accidents or struck by falling cornices sometimes—to wake up a dozen years later and discover that they have accumulated or lost a fortune, or reared a family, or built up a business, with a new name and a new personality, since that last conscious moment! Men, unidentified, have

walked out of hospitals, apparently sane and normal, but without the most remote idea of who or what they were before the crash, and—had something of the sort befallen Robert Mace? Had he actually married Dorothy March. Heaven alone knew how long ago?

One long minute he believed it fully and stood stunned; and then, with a rush, calmer thought came to him. The hard little chap in the pilot-house had insisted that he came aboard last night, and there is only one "last night" to any given morning.

And the girl was regarding his rigid pose with growing astonishment now, and Robert Mace dragged off his hat and advanced with a shaky:

"G-good morning!"

"Good morning, Mr. Mace." The wonderful eyes, clouding a little, sparkled nevertheless. "Is — anything wrong?"

"Well, I—I hardly expected to see you here, Miss March!" the man stammered.

"Oh!" The cloud vanished. "I have to accompany him very frequently."

"Accompany—" Mace began thickly.

"Mr. Welling," the girl answered.

"He isn't aboard!"

"But of course he is!" said the girl, with a puzzled little laugh. "He said that he would get you and then what makes you look so queer, Mr. Mace?"

The inventor tried hard to smile reassuringly.

"I am afraid there are several things here that neither of us understand," he replied. "Just er—just where do you think we are?"

"On our way to Boston."

"And I'm really supposed to be here, too?"

The girl's smile disappeared. Some few seconds she studied Robert Mace with a hint of annoyed confusion before:

"Please don't don't joke like that, Mr. Mace! You—why, you seem so odd! We are on our way to Boston to close your patent matter, of course."

"Just you and I?"

"And Mr. Welling!" his secretary added rather sharply.

The inventor of the rotary, steadying himself against the rail, came a little closer.

"It's the first intimation I've had of such an arrangement," he said flatly. "And Mr. Welling is not with us. And unless they've moved Boston south of New York or changed the sun overnight, we're not going to Boston!"

Plain terror showed in the girl's face as she turned toward him, lips parted, cheeks suddenly white, and something brought Robert Mace even a little closer as he said in a quick undertone:

"I don't know what's happened, and I don't think you do, and we'll have to compare notes and find out. But please don't look like that, Miss March. Nobody's going to hurt you while I'm around, and I'll be very, very much around until I've put you safely on shore again!"

A fluttering little smile struggled through the fright.

"I'm not afraid, but—but—"

"You're rather bewildered? Me, too!" said Robert Mace. "But there is one ray of lucid thought that strikes me at this moment, and that is this: whatever we may be doing here, such of the passengers and crew as I have seen seem to regard it as a perfectly matter-of-fact arrangement, and it may be wiser to let them think we are of the same opinion until we find out where we stand."

"Well?"

"So let's lean on this rail and gaze feelingly into the ocean and try to discover why we have any rail to lean on," Mace pursued cheerfully.

"But you said passengers?" the girl queried.

"You don't know anything about the passengers?"

"No!"

"Then suppose — slowly, you know, so as not to attract attention—you take a look at that interesting trio aft and see whether you recognize them."

He waited, curiosity burning, until the girl faced him once more.

"I never saw one of them before this minute!" she said blankly.

"I thought as much!" muttered the inventor. "But you're well acquainted with the boat?"

"I know that she is the Aletia. I've never been aboard before."

"And she belongs to Welling?"

"Of course not! She was the property of the Pressley estate until three or four weeks ago." The eyes were un-

comprehending circles now. "Dale & Wilmer were attorneys for the estate, you know, and this little vessel was to be sold at a given price—so high that she has been moored along the New York water-front for years, out of commission. Lately some one paid the price, and Mr. Welling was taking her to Boston to deliver to the new owner. There was something very secret and mysterious about it, but—isn't that what he told you?"

"It is not, and it's all Greek!" Mace said gently. "I'm afraid that you'll have to begin at the beginning and tell me the whole story of how you came aboard."

From the after-deck an explosion of merriment came to them; it was a hard, sinister chorus of laughter, too, and despite herself the girl shuddered.

"Very well, Mr. Mace. I—Mr. Welling caught me when I tried to get your papers, you know. He was waiting for something of the kind; he has an intuition for such things that is rather more than human. At all events, he turned on the lights just as I had located them and—why, I think he had guessed everything. He—made fun of me! He said that everything was quite all right—that he had decided to buy the patent, and all that, and—"

The charming profile turned away from Mace; the tip of the one ear within his vision was bright scarlet!

"Oh, it was—perfectly ridiculous!" Miss March hurried on. "I just fled, after a minute or two, and wrote you a note, telling what had happened. Mrs. Phillips walked into my room just as I was about to drop it."

"Mrs. Phillips?"

"The housekeeper. I'm certain that Mr. Welling sent her to watch me. I did manage to drop the note, though. Did you get it?"

"It stuck on a cornice!" Mace remarked. "I'm glad now that it did!"

"And she gave me a little lecture, and Mr. Welling pretended to be just passing and he had something more to say, too. And I locked my door and went to sleep."

"But you must have come aboard before—"

"That was later, of course — nearly three this morning. Mr. Welling himself called me and said that we would start at once, if I didn't mind, and come up this way. He said he had been doing some telephoning and that there was some kind of rush about the patent; he said he would put me aboard and see me comfortable and then get you and come aboard himself and—why, that's all!"

A good two minutes Robert Mace stared at the distant line where sea and sky met, and his color faded slowly. A number of things had grown clear these last few minutes. Welling, for one thing, had demonstrated himself a master of rapid-fire plotting and a master tactician, as well, since just now the two people in New York who had shown most marked signs of objection to his theft of the patent were bounding gaily over the waves to parts unknown.

But there was a meaner little twist to the matter fully worthy of Mr. Welling. Robert Mace and an exquisite young woman he had known for barely twenty-four hours had left public view together, and the impression of the one individual so far interviewed on board was that they were man and wife. They might return to the city after days, and when normal adults tell a tale of being kidnaped and carried away under such circumstances a cynical and understanding smile is likely to be the sole answer of a charitable world. Plain, icy fury vibrated Mace! Some time or other he would be back, probably, at ordinary pursuits; but before he ever settled down, whether it took one week or ten years, there was a new score to be paid John Welling that would take precedence even over the rotary engine!

"Well — we seem to be in quite a pickle!" he observed, with a rather strained smile.

"Yes, and if Mr. Welling isn't here and we're not going to Boston—"

The girl ceased speaking and turned quickly. A lithe, bowing little figure had just popped up from somewhere—a figure in white and with a cook's cap and little waxed mustache, who came nearer, rubbing his hands, and said:

"The hour ees late. *M'sieur et madame*—you will breakfast? *Oui?*"

Robert Mace stared at him in blank amazement for a moment.

"You're the — er — culinary department?"

"Cook of the yacht—*oui!*" The elec-

tric smile flashed at him. "This way, if you will to please?"

He waved a sweeping hand toward the stern and bobbed ahead of them at a gait that must have been of his own invention, and the startled, upward glance of the girl brought a smile to Mace's lips.

"We may as well," he said. "It was good of him to think of it. I hadn't."

John Welling's bewildered private secretary took his arm with a hand not quite steady and they followed in the wake of the white person. On the after-deck three pairs of eyes looked up suddenly, two of them with interest, the third, which belonged to the wholly foreign individual, with sudden animation at the sight of Dorothy. Mr. Mace caught the gaze and boiled internally. Were they, by the way, to sit down with these three and—no, evidently they were not. The trio, rising, had bowed to them; the little cook, holding open another glass door, was indicating the tiny dining-saloon of the yacht, its table set for two. The inventor of the rotary, acknowledging the salute in distinctly perfunctory fashion, followed through the door with a breath of real relief.

And with a thrill, too! For, whatever had happened and whatever else was going to happen, the mere pleasure of sitting opposite Dorothy March, with full liberty to look at her during an entire meal, was near to being compensation. Mace settled into his chair slowly, and the animated little Frenchman, fluttering humming-bird fashion, took the floor with:

"One asks pardon! The ship's company is, of course, quite incomplete at the moment. It is permitted that I myself serve?"

"I—suppose it is—er—"

"Henri, *m'sieur?*" said the cook, with a touch of dignity that was almost a reproof.

"All right, Henri!" muttered Mace, with a smile from which, even now, the dazed quality had not altogether vanished.

"*Bien!*" The black eyes twinkled at Dorothy. "*Madame* will desire cantaloup? It is our only fruit this morning."

The girl nodded.

"*Et m'sieur?*"

Mace inclined his head, and with a final "*bien!*" the guardian of the galley vanished through a tiny door at the other side so speedily and noiselessly that he seemed to have popped through the wall. The girl, however, was looking at Mr. Mace with some concern as she murmured:

"*Madame?*"

"It's—possibly it is better so," said Mace, with a slight flush.

"But does he think—do the rest of them think—"

"We don't know what they think just yet," the inventor replied, and his gaze settled on the tiny sugar-bowl. "But—I don't like the looks of that outfit out back there."

"Nor I!"

"And a man has ever so much more license to—to protect his wife than—than otherwise, of course!" Mace floundered on awkwardly. "If there's going to be any trouble I'd like to sail into it without any misconceptions on their part—or, rather, with one misconception pretty well grounded and—"

"But I don't want you to get into any trouble!" the girl said suddenly.

Mr. Mace looked squarely at her for a moment and spoke with an effort and very earnestly indeed:

"If you'll just have any quantity of faith in me," he said softly, "I give you my word of honor that you'll never have cause to think it misplaced!"

And for a fraction of a second the eyes across the table glowed at him in the remarkable way he had noted once before, and silently she offered him her hand. Mr. Mace took it and pressed the slim fingers—and just there the little Frenchman whisked into view again, paused for the briefest instant and beamed upon them and the guilty speed with which the hands parted.

It was a dainty enough breakfast, not quite appreciated by either. There were things which Mace told of his own night's adventures, and they were, perforce, told in jerks, for the yacht's cook flitted about the little saloon most of the time. Two minutes and his very nature seemed to expand with friendliness; he questioned them as to the destination and received answers that might well have set him speculating as to Mace's sanity. He heard questions about the

trio on the after-deck and shrugged his shoulders, palpably under the impression that Mace was attempting an involved American jest. The gentlemen were, of course, the guests of *m'sieur—ne c'est pas?*

His understanding of English, too, had a way of giving out that suggested the pricking of a balloon, and it grew upon Robert Mace after a very little that the collapse came inevitably upon his own asking of a pointed question. Here and there the spasmodic Henri could liberate a flow of slightly tangled English covering the range of half the human emotions; but once quizzed as to the yacht's crew or himself and his time of service here, the voyage for which he had signed, or the persons who had engaged him, he lapsed into liquid French and apologetic smiles.

Henri, then, had worked around to finger-bowls and still showed no signs of permanent disappearance when Mace's patience snapped, and, ignoring the excellent cigarettes just laid before him and the dozen queries that went with them, he ordered Henri out of the saloon.

Alone, he looked at the girl, silent these last few minutes.

"Worrying?"

She faced him in some astonishment.

"We don't know where we are, Mr. Mace! We're going away from New York and—and everything, so fast—"

"Nevertheless, don't worry!" smiled the inventor with entire calm. "I've come to one definite decision."

"Yes?"

"Quite so," said Mr. Mace as he laid aside his napkin and smiled. "I'm going to take the yacht back to New York!"

CHAPTER XIII.

Under Hatches.

MISS DOROTHY MARCH leaned forward.

"I don't think I understood Did you say 'take' it?"

"I said just that!"

"But—how?"

"I can't tell you that trifling detail yet."

"Because you don't know, Mr. Mace?"

"For that very reason, and no other," grinned the inventor.

"But this crew must have their orders from some one, if there is a crew."

"Undoubtedly."

"Have you money enough with you to bribe them?"

"I have seven dollars and some change, but I'm not going to try bribing them," Mace said dryly. "I think I'll try guile and subtlety this time and see what sort of results they bring. Force and hot-headedness on my part seem to have landed us both in no end of a mess."

Dorothy looked at him very thoughtfully indeed.

"Do you know, I hardly think you'll manage it!" she said quietly. "This isn't all Mr Welling's work, I'm sure. There are too many things about it that look like Dryden's scheming and I'd venture to say that he is the most daring schemer out of jail in the whole world."

"Go on."

"I think that he was in touch with Mr. Welling all last night—he may have been in the house itself. I think that he suggested all this and that the yacht was probably about to sail, anyway."

"And?"

"I'm afraid that's the end of my theories."

"Then we'll see how we can apply them and a few more of my own," smiled the inventor. "Will you agree to do just one thing for me?"

"Yes"

"We'll look through the forward saloon and make sure that nobody is in those other staterooms. Then I'm going to ask you to remain in yours, with the door locked."

He rose, and she nodded and followed. On the after-deck the trio, deep in conference of some sort, did not even look up as they passed forward swiftly; nor was the hard-faced little citizen in the pilot-house paying attention to them. Glasses to his eyes, that gentleman appeared all absorbed in a contemplation of the horizon.

Below, doors were unfastened. Two of the rooms showed signs of occupancy last night; the other was bare and untidy as the one that had witnessed Robert Mace's entrance to dreamland earlier in the morning. And, having made quite sure that even that lacked a tenant, Mr.

Mace bade his companion *au revoir* and listened to the snap of her lock. It might be rather dull in there; he suspected that it would be anything but dull elsewhere on the yacht.

Because—well, just what? Did he intend to go forth and, single-handed, thrash every man of them and then take in the vessel himself? The spirit felt fully up to the job, but he suspected that the flesh might not be equal to the strain. But his own words returned to spur him. Come Hades or high water, somehow or other, that vessel was due to return to shore and release Miss March from an intolerable predicament, and meeting guile with guile offered the one remote chance of success.

Wherefore, having finished his cigarette at the head of the companion stairs, Mr. Mace mustered a smile and strolled to the wheel-house ladder and up it and opened the door with entire assurance. The gentleman within, laying aside his glasses, regarded him with truculent inquiry:

"Well? Yer head cleared up?"

"It's cleared up, all right!" grinned the inventor as he lounged against the doorway and looked sheepishly across the waters. And that pose seemed to be drawing the mystery, too! He studied Mace with a dry smile; comprehending slowly, he asked:

"What was it? Kind of a wild night last night?"

"It was a wild night, take it from me!" responded Mr. Mace remorsefully.

The other laughed with real geniality and hitched nearer to him.

"On the level, didn't you know the old woman was on board, kid?" he inquired.

With a mighty effort Robert Mace maintained his grin and shook his head.

"No idea of such a thing!" he muttered.

"Well—you can't duck 'em, sometimes," chuckled the commander of the Aletia thoughtfully. "I had one o' me own once. She was just as suspicious. The old guy from Dale's brought her aboard last night — the same one that brought you."

"Yeah?" drawled Mr. Mace.

"Well, don't you even remember coming out?" the commander demanded.

"Say, I don't remember any more what happened last night—" said the inventor, with consummate art.

The hard little man guffawed his real enjoyment, and silence fell upon the pilot-house for a little. Once more the glasses covered the skyline and Mace inquired:

"Well?"

"No sign of 'em! We won't pick 'em up for another four or five hours."

"Pick up who?"

The man at his side looked up at Robert Mace with quick suspicion, and the suspicion died out again, for he was facing no more than a foolish, blinking smile and rather loose lips that said:

"On the dead level, I don't know why I'm here!"

"But you know pretty darned well where the yacht's going?"

"Too well!" said Mr. Mace, by way of trying an off shot.

"You're the boy Dale sent to collect the cash for her!" said the illuminative commander. And then, at Mace's genuine start, he fairly hurled information at the inventor, for he looked away and said: "There's nothing to get you scared in that. Once you've booked home from Trinidad under a fake name, who the devil's going to know how you came there? There ain't one chance in a million of them ever getting you. Somebody had to do it, anyway, and I guess you're the goat!"

Another spell of silence followed. The commander shot a sidelong glance to Robert Mace, and it occurred to that gentleman that in any variety of acting he succeeds best who does not overdo his part. He grinned bitterly at the hard little man and turned away with a savage:

"I knew they'd hand me that! I *knew* it!"

And it must have chimed nicely with the rest of the undivulged details, for the man of the wheel-house laughed with a little contempt as he said:

"Teach you to cut out the hard stuff, kid. I did it ten years ago. The old guy said you'd find written orders in your bag in case you woke up tangled."

Mr. Robert Mace merely grunted and sauntered away. "The old guy from Dale's," who had left "written orders" for him! The inventor smiled ever so faintly; plainly he was not the only one

on that trim little vessel who had been deceived by Mr. John Welling! And—Trinidad! Why, Trinidad was down in South America somewhere! It took days to reach and more days to return from; according to Welling's nicely made calculations, Mace, once back in New York, might well find somebody advertising his rotary engine for sale under "patent applied for!"

And for the rest of the jumble he had just heard the "they" who were to be picked up, the apparently undesirable job of collecting for the yacht, the unnamed dangers he had been delegated to face— Mace stopped short and formed another resolve. In the present meager state of his information, speculation was not only likely to prove fruitless, but to drive him insane! His first ten minutes of investigation had uncovered much; he would go farther and uncover more, keeping in mind the while that, to all intents, he belonged right here and knew why!

Of a crew there seemed to be entire absence. Decks, to be sure, do not need watching; but there must at least be an engine-room force. He would hunt for that next, and he hoped most earnestly that it could be reached without a trip to the after-deck and a possible clash with the still unidentified trio. Hands in his pockets, he strolled along the port side of the deck-house, humming, and —stopped again, this time with a smile of pleasure.

If a sudden swirl of oil and gas vapors meant anything, the engine-room was beyond this little open door, with the shining brass steps running downward on the other side. He looked in and sniffed; and then, boldly enough, he stepped downward to face one lone, greasy man of middle age and sour visage and, as well, the prettiest little power-plant he had ever laid eyes on.

A pair of mighty six-cylinder engines whirred with glorious smoothness; there was a dynamo and a mass of wiring running to posts on the panel behind that suggested ample storage capacity for the electricity; there was a glass-fronted switch-board on the farther wall; there were spark controls and throttles, levers and gages and oil-feeds, so tidly bunched together that one man could well control the whole engine-room without rising from the chair that held the present occupant.

The latter, by the way, was eying Mace without astonishment as the inventor reached his own level and looked about

"You're the gent from Dale's?"

"Yep!" Mr. Mace looked bored. "How's she running?"

"Never see the like of her!" the engineer beamed. "They tell me the fellow that built her designed the whole plant here."

"I believe he did," the other nodded vaguely.

"He must 'a' been a wonder—he must 'a' been a wonder!" reflected the oily one as he removed his cap and scratched reflectively at the grizzled thatch. "She'll do thirty knots and not heat a thing—I never see the like of her!"

"That's pretty fast going!" muttered Mace.

"I'll betcher!" responded his new acquaintance, with a chuckle. "She'll show her heels to anything on salt water, I'm thinking."

He dropped into a pleasant and presumably mechanical reverie, and the inventor permitted him to ponder undisturbed, and when he looked up presently he had arrived at a new train of thought, for·

"When we going to pick up the crew?"

"Pretty soon," hazarded the inventor.

"Well, I should hope it would be pretty soon!" the engineer said sharply. "I've been on here since midnight last night, y'know. I understood I'd have my two men before this"

He looked accusingly at Mr. Mace, and that gentleman smiled placidly.

"Don't worry!" he said. "They'll be here soon enough."

And he headed up the stairs again, for the excited grin would no longer remain concealed! Whatever prospective crew was coming, wherever they were coming from, just now the Aletia owned a crew of just two men! There were, doubtless, excellent reasons for the condition, but the fact itself interested him most. Why, he would almost undertake to lick the commander and the engineer, if necessary, and run the vessel back alone—if he could be quite sure that none of those three astern knew enough about machin-

ery to dare wrest control from him! He leaned on the rail and gazed over the ocean; it was wild, of course, but would he have any better chance later? Once this expected crew had arrived it would all be over, and -

He started and turned, for some one was calling on the after-deck. He squinted in the direction and found the scarred citizen beckoning him; and, having bristled a moment at the commanding air, Robert Mace turned and sauntered easily toward the group. The man with the scar went straight to the point with:

"How much have they done to this after hold?"

"Why—I don't know," Mace smiled.

"Well, when did they start work?" the other asked impatiently.

Mr. Mace glanced at the awning overhead.

"I don't think they started it at all," he said.

"What?"

"But I don't really know anything about it!" the inventor said hastily.

"Well, why the devil don't you?" snapped the man with the scar. "You're supposed to know all about the vessel!"

Mr. Mace studied over his reply for several seconds.

"I'm not the fellow they meant to send!" he submitted apologetically

An exasperated grunt left the other; his fingers snapped. The very foreign person, propounding a query, was answered by the apparent interpreter and shrugged his shoulders annoyedly; and the scarred man, staring at the hatch, said briefly:

"Get her open, then! We'll look her over ourselves!"

He jerked a thumb toward the hatch-cover and Mr. Mace looked at it. It was a mighty substantial affair, that cover, built of thick sheet-steel, secured to the deck just now by a pair of very heavy catches; below it lay—he knew not what.

But as he stared the hatch-cover, very suddenly, seemed to flame with a blinding radiance! Trio, deck, awning, and all the rest, left Mr. Mace's vision for an instant; his breath stopped short and his eyes came near to bulging; his hands closed and his lips parted. So, occasionally, does glowing opportunity burst upon the man able to recognize her!

"Well, get about it!" the scarred man ordered.

"I'll—have the engineer take you down!" Mace responded from a great distance. "He knows all about the boat. I—I don't!"

And he turned away from further questions and walked quickly back to the engine-room. There were, approximately, one thousand chances to one that the mad notion in his brain would flatten out to nothingness—or worse; but the man who wins that thousandth chance usually has something big!

"Say!" said Mr. Mace thickly. "You'll have to take those three down in the after hold and—show 'em what it looks like."

The engineer stared at him.

"I can't leave here."

"You'll have to. I'm an—engineer myself—you know."

"But—"

"Get about it!' ordered Robert Mace, with some very creditable impatience of his own. "You know more about the boat than I do."

And his pulses throbbed the harder, for the grizzled engineer had risen with a resigned sigh and had opened the glass door to the switch-board; his black fingers settled on the lighting switch tagged "After Hold," and he slapped it into the circuit

"Leave her just as she is, you!" he directed. "I ain't touched her for an hour."

"And he was climbing the ladder - and he had disappeared on deck! Robert Mace, settling languidly in the chair, bounced out of it again and, without a solitary glance at the power-plant, glided to the ladder and to the top of it and listened.

Half a minute or more he could catch no sound above the humming of the engines; then a sharp tapping of metal on metal came to his ears for a little—a word or two which he could not distinguish—and a distant bang! The kidnaped inventor gulped at the excitement that was near to choking him, and, crouching, attained the deck

Crouching still, hunched tight against the deck-house, he moved slowly aft, paused and listened, moved on again. Ten feet and he'd be able to see that after-deck; he made them and peered

ever so cautiously toward the wicker armchairs. They were all deserted now, and down the hatchway the felt hat of the foreigner was vanishing. The second step of an entirely mad scheme had worked out beautifully as the first.

Beside the open hatch the steel cover lay invitingly; Mace looked it over with maniac eyes! Just one good heave and it would be in place—and he flattened out and squirmed along the deck toward it and strained his ears again. There could not be so very much room down there, he fancied; yet he was astonished as he reached the edge and permitted himself one downward glance. A considerable distance below him the housing of the twin shafts was visible and a few swinging incandescents; the four had passed out of his range.

And there was a swinging steel ladder leading to the depths that could be detached with one twist in the right direction. And there came a yell from Robert Mace, small and exultant, as he gave the twist and, with lightning speed, hauled the affair on deck. Below, some one shouted; he caught the sound of steps—and now he was dragging the cover upright, and now he was lowering it over the open hole.

And now, by all the gods! he had dropped it into place and kicked the heavy catches into their locked position; and, whatever else might happen, four of the six strangers aboard the Aletia were safely under hatches!

CHAPTER XIV.

With War Declared.

FOR a moment sheer joy turned Mace giddy. There was always the chance that there might be some exit from the after-hold other than through the gloriously heavy hatch; but, ignorant though he might be of marine architecture outside the power-plant, he doubted it. That engine-room was too broad and set too deep in the hull to admit of passageways.

Whatever their status, the four were down there, and due to remain. Even now the most distant of shouts reached him — faint, savage little noises that meant nothing at all to the gentleman on deck. He smiled and, calm returning, considered the little ladder, it was better elsewhere than here. He picked it up and, sliding it over the rail, consigned it to the depths!

The Aletia, meanwhile, was running herself. It might be better, before going further with his wild career, to give her machinery a quick inspection—and he headed for the engine-room once more, looking over the forward section of the craft speedily. It was possible that the commander might leave his little pilot-house; it was further possible that the Frenchman might take to wandering; but they were not in sight yet, and Mace ran down the steps and sent a quick, familiar eye over the engines.

They were running exquisitely. If this thing over here was the gasoline gage, though, fuel was getting rather low; breathing hard, he cast about for the source of supply and found it in a little motor driven pump and valve. He threw on the former and opened the latter, and he nodded pleasure at the rising liquid in the gage. Pressure in the tank was good, too; the oil system was pumping beautifully—the magnetos left nothing to be desired—the jackets on the cylinders were encouragingly cool. As matters stood, there was no plain reason why the engines should not look after themselves for another space; he shut off the reservoir pump and bounded up the stairs once more.

Next?

Robert Mace gnawed his lips and considered. There was not a doubt possible that a fight with the commander was coming. Perhaps he could best the hard little citizen; perhaps not; certainly not if the French cook were there to steal up behind and stun Mr. Mace with a rolling-pin, or whatever else might be convenient!

The Frenchman was next in order, then. The inventor passed along the deck again—around the after-deck—and stopped. Here was the door to the galley, open and revealing the Gallic person busy over copper pots that steamed on a small electric stove. And his apron, flowing though it might be, failed to conceal a highly interesting bump in the region of his hip pocket. Mace was considering it as the swift smile turned in his own direction and the other inquired:

"*Madame* will prefer the clear consommé, *m'sieur?*"

The inventor braced himself and stepped in.

"*Madame* is most particular about her consommé!" he stated. "Let's see it."

It should, he figured, be on the stove, which would necessitate Henri's bending forward. Instead, the little Frenchman whisked to the white ice-chest and opened the top to produce a covered bowl with a flourish. Robert Mace considered it and shook his head.

"I don't like the looks of it!" he stated flatly.

"But, *m'sieur!* I am desolate!" the yacht's cook informed him.

"Never mind! Try it, anyway. That ice-box isn't particularly clean."

"But—*m'sieur!*" gasped its custodian.

"Lemme see the lower part!" snapped Mace.

The bowl whisked back to its place against the ice. Henri, outraged, bent to open the lower door—and just at that point Mr. Mace landed squarely on his back, threw one quick arm around him and pinned both hands and, with a tug, tore loose as large an automatic pistol as could well be carried in a pocket!

"And here," said the inventor as he leaped back with the weapon ready, "is where we stop talking food and get down to business! You stand over in that corner!"

"But—*m'sieur!*" the imported one cried "One does not comprehend—"

"One doesn't have to comprehend. One just has to obey or get shot in this case!" said Mr. Mace. "You move and I'll drill you through, just as sure as there's a sky above us. Is there a key to that dining-saloon door? Fine!"

He turned it and dropped it into his pocket. He smiled wickedly at the yacht's cook and stepped to the outer door. There was a key here, too—on the inside for a moment and then on the outside, as Mace slipped it into the keyhole and turned to Henri with a steady eye and a steadier pistol.

"You seem to have a pretty good command of English when you need it," he said. "You need it at this minute more than ever in your life before. Get me?"

"But—yes, *m'sieur! Mais—mille tonnere!* One does not—"

"I don't know whether you can kick down those doors or not," the inventor went on. "I presume you can if you have strength enough. But this much I can tell you: the first kick I hear, the first time I see your charming face outside this little coop, I'll kill you and throw you overboard! Does one comprehend *that?*"

"One does, *m'sieur!*" the Frenchman said faintly.

"Then that's all that's necessary!" responded Mr. Mace as he slammed the door and turned the key—and then, on second thought, tossed it overboard!

There was something very like a hysterical note in his laugh as he looked after the thing. Actually, there was only the commander left between himself and whatever complete control he could exercise single-handed over a full-grown power yacht! And now he would take this excellent pistol and step up to the blue-eyed citizen of the pilot-house and—or would he?

Very frequently, when victory seems assured, little accidents happen. It was a long way from impossible that the commander, sighting Mace first, might drop him in his tracks. And if some such unfortunate incident took place Dorothy would be quite alone, quite unprotected here! The inventor of the rotary stiffened and made straight for the forward companion stairs and down them.

A knock on the stateroom door brought instantly the girl's quick:

"Well?"

"Only Mace!" that gentleman responded cheerfully. "Will you open the door?"

The lock clicked and the girl was before him and looking at him anxiously; and then, as he noted, with a little relief.

"I—I just dropped down to see how you were getting along," he smiled.

Welling's secretary dimpled.

"I've been reading a newspaper five years old," she informed him. "I found it in the locker. Have you—"

"I haven't been doing much of anything," said the inventor, "but I wanted to make sure that you were all right."

"But have you found out where we're going?"

"Trinidad, according to their schedule. New York, according to mine. I think I'll manage to have it changed,

Miss March. Meanwhile will you keep this thing?"

"That pistol?"

"Yes." The inventor snapped open the magazine and inspected the clip of heavy cartridges. "It's all automatic, you know—if you want to fire it you have nothing to do but pull the trigger."

"But I don't want to fire it!" the girl cried. There was terror in her eyes, too, and Robert Mace managed his very best smile again.

"I understand that," he said, "but I—found it, and I'd ever so much rather not lug it around with me. If you'll just please keep it."

He turned away, with the blue, death-dealing contrivance left upon the bed, and the girl followed him out of the stateroom.

"Won't you stay down here with me for a little and tell me—" she began.

"Will it be all the same if I come back in, say, ten minutes?"

"Why, yes. But—"

"Then I'll try to come down again then—with some news. And just lock yourself up till I get here."

Reassurance fairly radiated from him; the girl turned back and sighed, puzzled, and with a hesitation that hinted at impending rebellion. Mace, waiting for the snap of the lock, shut his teeth and returned to the deck.

Well, the trio and the engineer were not in sight, at all events. And the door of the galley had not been disturbed. That was much. He stepped to the little pilot-house ladder and looked upward to the man in blue cap and coat, peering through his glasses again just now.

Mace had not quite realized it before, but—those were mighty shoulders! Under the tight jacket muscles stood piled on them; and down the sleeves further lumps indicated biceps that might well have given pause to a heavier man than the inventor. And there was a business-like lump in this hip pocket, too, which spoke strongly of possible disaster!

A good minute Mr. Mace studied the gentleman from behind; and down in the secret depths of his being he knew that his nerve would never stand the strain of another full minute's inspection. So abruptly as to astonish even himself, he stepped up the ladder and opened the door.

One instant he weighed the chance of snatching the pistol, and discarded it. A twitch of the powerful hips, certain to come at the first warning touch, and Mr. Mace's days of yacht-capturing might be over. First and foremost, the senses would have to be battered out of that hard, round skull, somehow or other—and just as the commander lowered his glasses Mace reached upward.

There was a quick, startled backward drag, but one not quick enough. The first tug had done its work, and the Aletia's guiding spirit toppled from his stool and plunged outward, hands waving wildly, cursing, gripping at Mace, gasping his utter astonishment. And his assailant, with a backward bound, had attained the deck and landed on his feet, the grip on the shoulders unbroken.

A stumble—a roar—and for a twinkling fragment of time the inventor fondly imagined that the other would fall flat, with himself on top, pounding before he landed. Another stumble and a quick recovery, and the most businesslike fist afloat had hurtled past Mace's head, and its companion was whirling behind the hard little man and toward his pistol-pocket.

Yes, and the weapon had whisked into sight now and the fingers were winding about the butt—and quite regardless of what might happen to him, Robert Mace leaped at the wrist and caught it and twisted before the grip could quite close—and then laughed wildly. Luck was with him even yet. The gun had spun from its owner's fingers and landed on the deck, all of twenty feet away!

It was a mighty piece of good fortune, and his heart bounded at the sight of it; and just then Mr. Mace caught the full glare of the commander's eyes, as he crouched for an instant, and the heart all but stopped! In that savage grin that showed the double row of yellow teeth there was amazement and there was rage, but above all else there was plain murder, if ever it showed upon human countenance! The hard little man had every intention in the world of eliminating Robert Mace from the scheme of things in general, and the inventor knew it on the instant and quivered. He had never yet been in anything approaching a real fight to the death, but now—the commander of the Aletia had leaped for him!

Another awful blow was coming, straight for his jaw; he threw up his arm and ducked aside, and for an instant he fancied that the arm had been broken. Pain fairly tore at him, and rage roused suddenly in Mace's bosom; his every sense, half-stunned for a little by the terrific grin, leaped back to life. There was another vicious swing coming in his direction, and he squinted and crouched beneath it and drove into the commander!

And he had landed the blow—and something had struck him on the shoulder and brought a yelp from him—and just there Robert Mace lost track of everything on earth save the task of putting the hard little man out of the running. His muscles had turned to steel and his flesh as well, for blows seemed to be bounding off him with little or no sensation; red whirled before his eyes—hot breath was on his cheek for an instant—and then, so suddenly that he could not quite grasp what had happened, the other had clinched with him! Iron arms were around him and he had been lifted bodily from the deck. A rough head was driven into his chest, secure from blows, and the commander was staggering straight for the rail.

One backward glance brought very remarkable calm to Robert Mace. Five steps and he would be in the water for good! The rules of civilized warfare seemed to have been suspended for this conflict. Mr. Mace, quite deftly, slid down a hand and drove strong fingertips straight into the little man's closed eyes and held them there, and a scream of pain came up to reward him, and the grip was loosening.

A twist, and he was out of the clutch. A dive, and he had taken his own grip on the commander of the Aletia and was bending him backward—and then a crash and they had struck the deck, with the blue-coated man underneath. Legs kicked, blows rained on Robert Mace; he waited, second after second, for the writhe he wanted most; and it came and the commander had lifted head and chest with a mighty effort; and Mace, with a mightier one, had driven the head back to the deck with all the strength in his body!

A sickish shudder ran through the inventor; he had done it! Dead or stunned, the gentleman of the cap lay quite still now, and very limp. Mr. Mace set his teeth and rose slowly, and then sighed his relief; the scoundrel's neck had not been broken, at any rate, for he groaned faintly.

And being able to groan now meant that five minutes hence he might be able to fight again, and the inventor looked about quickly. According to his hazy notion of ships in general, there should have been assorted coils of rope about; there were none, save that heavy hawser forward—and grotesque or not, that would have to do. He raced to it and threw off a dozen tarred coils and sawed through the thing with his jack-knife; he bounded back and made shift to tie up the limp figure when he had turned it on its face. He finished, after a little, with yards and yards to spare; and with a somewhat wild chuckle, the inventor of the rotary dragged his last antagonist to the rail and lashed him fast to its posts—and stood erect, with the deck, the sea, and all swimming crazily!

Beyond any question, single-handed, he had captured the yacht Aletia!

Some little time he stood there and collected himself. From the deck came a reassuring, stronger groan and a movement of the head—and from the companion stairs came a little scream! Robert Mace straightened up suddenly and looked in the direction, and the one girl was running toward him crying:

"What—what was it? I heard the crash! I—oh!"

She stopped at the sight of the Aletia's commander, and Mace essayed a smile with lips that were quite out of plumb on one side.

"*That*," he said, "was the crash!"

"But you're hurt! You're cut—there on your head! I—"

"It's nothing, I assure you. That's the right thing to say, under the circumstances, isn't it? I—"

The pretty mouth was compressed as Miss March surveyed the inventor.

"You come below with me!" she ordered. "There is fresh linen in my locker—I saw it there—and I'll do what I can to dressing—"

She laid a compelling hand on his arm and Mace laughed outright.

"I can't—not now," he said. "I'll wash up in a little, and I'm not badly

hurt—honest! Do you quite—quite realize that you and I are going to take this vessel in alone?"

"But the others—"

"I don't know how it happened, but they're all disposed of," the inventor said, almost solemnly. "Do you know anything about sailing a ship?"

"Absolutely nothing!"

"We start even, then! Come!"

He led the way to the empty pilot-house, and the girl, shrinking away from the still figure by the rail, followed. Robert Mace regarded its late domain very thoughtfully.

"This thing's a compass!" he announced. "This thing's a switch that must control a motor-driven windlass, somewhere or other. Further than that, we're going south, and if we're on the Atlantic Ocean, America must be west of us. Therefore, if this switch works and we steer due west, we're dead certain to hit land! That may not be good navigation, but I'll bet it's logic. What are you crying about?" demanded Mr Mace.

"I'm—not crying!" choked Welling's private secretary, looking away.

"Well, don't, anyway. Wait a minute! If the darned thing acts as it looks, we're going to turn to the right when I throw her over." He threw the switch and held his breath; and then an exultant yell left Mr. Mace. "She works! By thunder, she works! Look!"

Slowly, steadily, the yacht was swinging about; slowly the magnetic arm traveled around the dial; slowly the sun slanted into the front of the little wheel-house! The switch went over once more and, since the vessel choose to veer a little farther, in the other direction as well; and Mr. Mace's distorted grin was directed at his companion.

"As sure as you're born, I've got her headed west!" he announced. "Can you take care of this department?"

"No!" said the newer voice of Miss March.

"But—oh, see here!" Robert Mace, quite astonished at himself, laid gentle hands on her shoulders and turned her to face him. "Dear little girl, this isn't any time at all to lose your nerve! We've got things going in the right direction at last, and all you'll have to do is to sit here and see that this compass thing stays put! See it?"

"I see it."

"And if we begin to swing around—let's see! These must be the engine-room signals. Press this one and keep your finger on it. And then there's one thing more, which can't possibly happen—but it might happen, anyway. If *any one* shows his face in the neighborhood of this house, just put your hand down on the whole bunch of buttons and press once, and—I'll be here. You'll do that?"

"I'll try."

"Good! Where's your gun?"

"I'm sure I don't know," Dorothy confessed. "I—forgot all about it when—"

The inventor of the rotary stepped to the deck and back again.

"Never mind," he said cheerily. "Here's another one"

He backed out of the place, and abruptly round, moist eyes were turned in his direction and—

"Where are *you* going?" Dorothy demanded.

"Down to the engine-room, just for a few minutes. Somebody has to be there, but—I'll be back!"

And he turned and fled, before a second long look could tempt him to remain there. Before him, the deck was all deserted, save for the commander, whose head moved even as he looked. A last glance at the fastenings, and he concluded, with much justice, that they would have secured a mad elephant, and moved briskly to the engine-room.

Once in the chair, relaxation came for a minute or so, and Mr. Mace trembled to his heart's content, and then abandoned trembling as unworthy of an individual who had just captured a full-fledged, sea-going vessel, and took to chuckling. He was a sight for the gods! So much the first glance in the switch-board cabinet door told him; and when he had opened the door to cut off the after-hold lights, he regarded himself afresh. His collar pivoted on the back button, his tie had disappeared altogether; the shoulder having been almost torn out in one piece, the excellent fit of his coat seemed to have suffered; and even in the poor light Mr. Mace guessed that by to-morrow morning there would be several rich blue spots on his countenance. There was the cut, too, just be-

hind the temple; and with happy disregard of sanitary precautions he found a handful of clean waste and the water-tap, and mopped away a quantity of blood

And the wonderful twin engines were humming along as nicely as ever! Robert Mace looked them over with real affection—and then looked up with a very violent start, for a shadow had appeared on the brass staircase!

Some one was coming, and a man, by the bisected reflection! And the some one was advancing without caution, it appeared, since legs came into view and then the rest of the body of the cook

He had broken loose—and all that that one fact might mean burst on Robert Mace as he cleared the engine-room at a bound. And yet, being loose, other things seemed to have happened to Henri, too. The French atmosphere had dropped away from him, somehow; his step was steady and without the humming-bird effect, his hands elevated in the accepted attitude of surrender; but his grin was what staggered Mr. Mace.

It was an entirely normal American grin, all amusement; and even as the inventor panted to him and raised violent hands, the little cook remarked, in perfectly good United States:

"It's all right, kid! Don't kill me! Only—who in the Sam Hill *are* you and what are you trying to do to this boat?"

CHAPTER XV.

The Chef Explains.

THERE was that about Henri, the chef, which Mace had disliked vaguely on their previous meetings; yet there was something about him now that made real appeal to the inventor, however ridiculous he himself might consider that state of mind. It was, he concluded, the man's iron nerve; for unless his air at the last interview had lacked conviction, Henri had every reason to believe that sudden death awaited him!

"How did you get out?" gasped Mr. Mace

"I came out with my skeleton keys," grinned the yacht's cook. "As a matter of fact, I've been out all the time, and if it had seemed really necessary I'd have lent you a hand."

"Eh?"

"But I thought I'd better keep out of sight until you worked off some of the enthusiasm," pursued the enigma; and there merriment overcame him and he leaned against the rail to deliver himself of a shouted: "On my word, I thought I'd seen some heavy-weight performances, but this thing of one man cleaning up and operating a yacht's the biggest thing I ever dreamed of!"

He subsided and his eyes twinkled; and Mr. Mace, facing him, felt the need for caution rising anew. A second he glanced at the several little gongs and wondered if anything untoward had prevented a necessary ringing of them from the pilot-house; and he said evenly:

"It's pretty good, and I don't understand it. But I don't fall for it!" He nodded at the other. "So you just get into the other corner of the room, where I can keep an eye on you and outdoors at the same time!"

"I'll do it, if you say so, but there's no need of it, believe me."

"I'll be the judge of that!"

The smaller man surveyed him gravely, and an odd note of authority came into his tone

"Just a moment, before we have any more nonsense. Please tell me who you are?"

"My name is Mace!"

"And what are you doing here?"

"At present I'm taking this boat back to America, my boy," said the inventor. "With all on board, you included!"

"I had inferred that much, but" The eyes grew suddenly keen and Mr. Mace felt, with marked astonishment, that they were looking into his very brain; and then: "See here, I'll take a chance on you, whoever you are! Just look at this!"

He reached into one of his trouser-pockets and, after seconds of fumbling, turned it inside out. He beckoned, and Mace leaned over and inspected the pocket; and then, as it was slipped quickly out of sight again, he emitted a thunderstruck gasp of:

"That thing—you—*the secret service!*"

"In the name of common sense, *shut up!*" snarled the remarkable cook. "Haven't you sense enough not to yell like that?"

"But when you spring a thing like that on a man—" Mace faltered. "This—yacht and those men and all the rest of it doesn't belong to the Treasury Department? I haven't—"

"You not only haven't, but you're not going to, if I can help it," the other said crisply. "Do you feel well enough acquainted *now* to talk business?"

"What sort of business?" Mace asked thickly.

"We'll come to that very shortly, Mr. Mace, from what I can glean, people here fancy that you're some sort of agent for a law firm in New York, and that you're here to collect for this yacht. That's wrong, of course, because the price was paid in full two weeks ago. It is also fairly plain that you've no desire to be here. Why are you here, then?"

The concise fashion of proferring facts infected Mr. Mace.

"I was kidnaped," he stated, "to give a wealthy gentleman time to steal a patent!"

"Eh? Who?"

"John Welling."

"*The* John Welling?"

"I suppose so."

The smaller man's eyes narrowed.

"What'n blazes connection has *he* with this?" he demanded.

"I give it up."

"Is he interested in the Dale & Wilmer firm, by the way?"

"He's one of their big clients. Er—Dryden may have suggested –"

"I know Dryden. He engineered this yacht sale," the other meditated. "Well—go on."

"With what?" inquired Mr. Mace. "I don't want to be here, and I'm going back—that's all. Some time before night we'll find the coast!"

"Yes, and in about an hour we'll have run up a Jersey beach and traveled half way across the State, at this rate!" said the unusual cook. "That's exactly what I want to avoid. We're not fifty miles from New York at this minute, you know; we made one big circle early this morning, and I think we were about to start on another when you—er—erupted!" He frowned at Robert Mace. "Where is the party that occupied the after deck? Overboard?"

He grinned suddenly.

"They're down in the hold, with the lid on tight!" he stated. "And now that the first dazzle of that badge of yours is out of my eyes, I think I'll have to treat you with the same unkind suspicion that landed them where they are and—"

"My dear young man," interrupted the mystery, "just apply a little common sense to the proposition. I've been loose since about one minute after you locked me up, and I deduced that the crowd was in the hold. Was there anything under the sun to prevent my lifting that hatch, if I chose? Was there anything to prevent my sneaking up and rapping your skull while that highly interesting battle was on?"

"Maybe not, but—"

"Then, for Heaven's sake, slow down those engines and let's try to settle things to our mutual satisfaction!"

The unusual cook was biting his lips with plain anxiety.

"I'll slow down nothing!" stated the inventor.

"But the coast was just coming into sight when I left the deck!" the other said wildly, "and—"

"And if nobody moves the coast, we're going to hit her with a bang that'll smash this craft in two, and I don't care a continental damn so long as the young lady and I get ashore alive!" said Robert Mace with much force.

The whilom Frenchman controlled himself with visible effort.

"All right!" he said. "I'll have to talk quick, then. Have you any idea of the real purpose of this cruise?"

"Not the slightest?"

"Then I'll tell you this, and if you repeat it ashore in time to spoil things I'll have your scalp if I spend a lifetime over it! The vacht, in the first place, was purchased by one of the finest, best organized, and most fiendishly efficient bands of high-class smugglers in the world!"

"Eh?"

"And the individual with the scar is, so far as we know at present, the head of it, with the Spaniard a pretty close second. At any rate, they've been operating for five solid years, and we haven't landed one of the gang yet. This particular stunt is the biggest thing they've ever tried, and eight or ten of us have been working on it for six

months. They've purchased the Aletia because she can run away from almost anything, and she is to be overhauled and turned into a high-speed cargo boat. The general idea is to take on the stuff from other vessels on the high seas and run it in along the southern coast. It's the old, spectacular game, brought up to date and driven by gasoline, and it'll work out to the queen's taste."

"And —"

"And some time before night they expect to pick up a crew of eight men from a tramp steamer, and five of those eight are in the service with me, and—say, have you any conception of what that means in the way of fine work?"

"Some."

"Then, for the love of goodness, let me put you and your wife ashore!"

"She's not my wife!" Mace began darkly

"Whoever she may be—she's very lovely!" said the other, with a lightning, respectful apology. "Afterward, I'll make myself solid forever by turning the whole gang loose and letting the good work go on according to original plans; and when the time comes to make the big haul —"

He glowed with what certainly looked like genuine professional enthusiasm, Mace reflected. Also, there was great truth in his statement that, loose, it would have been simple enough to have had Mr. Mace overboard long before this.

"This thing of getting ashore—" the inventor began.

"It's the easiest in the world. Ten minutes from now, at this clip, we won't be five miles from solid New Jersey shore, boy! Got that gun?"

"I can get it."

"Then stop the engines and take me by the collar and walk me on deck with the gun at my head! Make me lower away the gas tender—she's a dandy—and then get into it with the lady and make for shore!" He quivered with anxiety as he studied Mace. "You won't be pursued, believe me. There's nothing in the world they desire so little as getting into sight just now."

His fingers were snapping unconsciously and the dark eyes blinking rapidly.

"I'll have a look at that shore first," said Robert Mace. "You stay here!"

He turned away and turned back as quickly; far from attacking him, the cook had settled on the edge of the chair and was twitching with impatience. Mr. Mace stepped to the deck and shaded his eyes —and started! All day they must have been lurking just out of sight of land! Dead ahead there was not only unending stretch of shore, but houses, big and little, were perfectly visible. Another fifteen minutes of this and they would, literally, be high on the shore—and the inventor glided away suddenly to the companion stairs and down them, into Dorothy's stateroom and out of it again —caught for a second the murderous glare of a perfectly conscious commander, and slipped into the engine-room with the cook's own automatic ahead!

"You're on!" the inventor announced.

"Will there be any way of leaving me that gun, when you're done threatening me?" the other asked, unsmilingly.

"Unloaded?"

"Yes. I have any quantity of ammunition. I—" The remarkable little cook had snatched the weapon from him, opened it, and dumped out cartridges, and handed both back. "You'll have to manage it, Mr. Mace. And one thing more."

"Well?"

"Just remember, before we get into public view, that I'm the French cook aboard! My mother was French, and it all comes pretty easy; but just ten seconds after this gang suspects that I'm anything but the kitchen force, my life won't be worth a plugged cent! Understand?"

"Perfectly," smiled Robert Mace, as he cut off the sparks and shut both throttles. "Ready?"

"*M'sieur!*" screamed the cook "*M'sieur!* I implore —"

And through the unearthly stillness that had settled on the vessel

"Dry up and get out of here!" Mr. Mace thundered. "Go on! Get out there!"

He laid a heavy hand on the smaller man's collar and bounced him to the deck; teeth showing, he propelled the cook to the pilot-house, screaming, chattering, imploring the commander to break loose and save him! The girl, wide-eyed again, looked on the picture—and then found curious reassurance in the very

strange grin which Robert Mace directed at her as he said:

"We're leaving now! Come, please!"

From the wonderfully trussed man inarticulate roars mingled with the cook's screams as they made for the after-deck; screaming still, and out of sight of his commander, he went briskly to work at the davits, and he ceased screaming for a moment to whisper:

"Tank's full—I saw them fill it yesterday. Let the lady step in—you'll have to slide down and— *Mon Dieu, m'sieur!*" he concluded vociferously

The white-cheeked girl stilled a little scream as blocks rattled faintly and the launch began to lower; her hands clenched and she stared upward; and then the tender had touched water and Mr. Mace had passed the pistol to his newest friend, watched that person slip it into his pocket and nod, and he himself glided down the rope and stumbled into the bottom of the beautiful little twenty-five foot affair and cast off!

The cook, clasping his forehead, shrieked to the very skies—and the Aletia drifted away on the glassy sea. Alive, unharmed, with Dorothy March at his side, Mr. Mace had actually made good an escape from the nightmare yacht; and he looked after her rather stupidly, and then bent swiftly over the engine. Henri, or whatever his true name might be, had rushed to the rescue of his suffering commander; it behooved the tender to move!

And it moved at the first turn of the fly-wheel—moved with the same beautiful speed that had roused his admiration in the little engine-room. He tugged at the steering-gear cable and brought the little boat around, advanced gas and spark together, and grinned sheer delight at the way she responded; and then, with thick white churning up in their wake, he turned to shout exultantly at Miss Dorothy March.

Oddly, something happened to the shout. The girl was trembling slightly; her eyes, moist again, were steadily upon him, unafraid and with the same glow that had thrilled him before. Robert Mace sat down on the side-cushions, heart pounding.

Later, when the story had been called back to her from the engine-side, a long dock and what seemed to be a summer hotel, deserted as befitted the early season, loomed up ahead. There was a boy on the dock who waited to throw Mr. Mace a rope, and greet him as one should be greeted who comes ashore from such a yacht as the one out there, racing seaward again just now. Yacht people and dollar tips are almost synonymous.

The boy, therefore, made fast both ropes and beamed on the young man who scrambled to the planking, and all but lifted the very pretty young woman after. It was in the boy's mind to open conversation with a comment on the fine weather, but the—rather battered, as he noted at second glance—young man forestalled him with:

"Is this Jersey?"

"It suttinly is!" grinned the youth.

"Where's the railroad station?"

"Four miles back o' here."

"When's the next New York train, kid?"

"Two-one; you can't make it, mister You—"

"Could an automobile make it?"

"Might if it went like—"

"Is there a good car here?"

"Why—Joe's machine's all right—yessir!" the boy reflected, "but—"

"Kid," said Robert Mace, "do you see that launch?"

"She's a dandy, mister! I see her "

"You have an automobile ready to take us to that train, or catch it farther on—have the automobile ready in two minutes, and I'll make you a present of that launch! That's dead straight! Git!"

Five tremendous seconds the boy looked from the maniac to his fifteen-hundred-dollars' worth of boat, and then the boy had plunged up the dock like a maddened kangaroo, and Robert Mace was saying grimly to his companion:

"You know, *maybe* Welling hasn't that engine all stolen, even yet!"

CHAPTER XVI.

The End of the Run.

ACIDIFIED gloom had settled on John Welling's butler as the shadows grew long that afternoon. Years ago—it had happened in the house of one of Welling's friends—that gentle-

man had detected the butler in the mistaken act of leaving the house with most of the silverware; and while the butler's very soul had been touched at the time by Welling's kindness in employing him to reform him, the butler understood more fully now just how effectively a matter of silverware can be held over one's head. Twice, following his kindly employer's orders, he had locked a man in a room of that house and kept him overnight, protests notwithstanding; once his own violent objections overruled, he had slipped a certain white powder into another gentleman's champagne—and spent two fearful days wondering whether he would wake up in this world or the next.

But when it came to being planted in a lower hall, with orders to deal blows to the first man who descended after the lights went out, the full time for reflection had arrived. In the hallway the butler fell into a black study: was it better to flee for the police and tell about the silverware himself or wait until Mr. Welling had planned a full blown murder?

As he pondered, some two blocks away a battered young man left a corner drugstore and spoke to an extremely pretty and somewhat disheveled girl.

"Whoever answered the telephone said he hadn't been at the office all day. That probably means that he's home. You can't go back there."

"I had no idea of going back," the pretty girl said quietly.

"But—that's your home!" Mr. Mace said, with deep perturbation. "And—"

Miss Dorothy March smiled.

"Don't worry about me, Mr. Mace. I've been thinking it over on the train. I have a few friends in town, you know, and I'll go up to a cousin's for the present."

"Whereabouts?"

"In a perfectly safe and conventional apartment just five blocks up this way—the Draymont, I think, is the name of it. Hilda's husband is a Mr. Fenley; you'll find it in the telephone book if you need me."

"But you don't think for an instant that I'm going to drop out of your life as soon as this patent matter is settled?" Mace cried blankly. "After all you and I—"

He had taken the offered hand; now for a flitting instant the fingers pressed his own as the girl smiled:

"It will be settled forever if you don't hurry. Good-by!"

"There's no 'good-by' about it!" the inventor of the rotary protested—this time to an empty gap of air, through which a messenger boy walked slowly. The latter looked at the retreating young lady and then at Robert Mace, hat in one hand, the other outstretched in protest, lips parted; and the boy's young, hoarse laugh of appreciation brought Mr. Mace to earth again. One last, long look after the graceful, hurrying figure—a last little smile that came over her shoulder for a second—and Mr. Mace coughed and patted the torn shoulder of his coat back into place and headed eastward.

With conversation next to impossible in the clattering day-coach, he had done some thinking of his own. A thousand things might have happened to his patent since three that morning; yet he suspected strongly that, with himself and Miss March out of the way for days, Welling had not hurried himself unduly.

And what a dyed-in-the-wool scoundrel the man was! Mace's own end of the thing was bad enough; but the thought of Dorothy, her reliability apparently gone as Welling's secretary, being set afloat with a band of professional criminals, to meet whatever fate might be, sent a white blaze of fury through him. He smiled, with a calm that was no less than dreadful, and dropped his hands to his coat-pockets as he turned quietly enough up the steps of John Welling's home.

All of which explains why the butler, roused from his reverie, opening the door mechanically, found himself pushed against the wall, with the muzzle of the Aletia captain's revolver in the pit of his stomach, and heard, even before his own dumfounded gasp at the sight of the kidnaped one:

"You make one sound and I'll kill you! D'ye hear?"

"I—hear!" the butler managed, after a considerable effort.

"Is Welling home?"

"Yes, sir."

"Where?"

"In his library."

"I don't want to be announced. If you touch a bell or give him any other warning that I'm coming I'll kill you! Do you believe that?" said the inventor.

"I do indeed!" the butler replied from the depths of his being. "He—isn't alone, sir!"

"Who's with him?"

"A Mr. Risland, sir."

"Risland!" Excitement came near to lifting Mace's voice from its whisper. "What Risland?"

"Mortimer, I think is the name, sir. The card's there."

A long, long time, as it seemed to the butler, the violent visitor thought.

"Where can I overhear what they're saying?"

"From – from the dining-room, sir. There's curtains."

"Take me there. You stay with me!" ordered Mr. Mace. "Be quiet about it!"

The chalky visage turned away. The persuasive muzzle bumped neatly against the backbone of its owner, and it was fortunate indeed that no housemaid strayed through the mansion at just that minute. Through a little drawing-room they passed and into the darkened dining-room, and there Mace listened. They were talking in the room beyond. He stepped to the curtain and peered through, to catch his breath.

Welling's butler had spoken with entire truth. Side by side with his master, the president of almost the richest engine corporation in the world was examining the original plans of the Mace-Darling rotary! And then, as he backed out of sight, he caught clearly:

"Absolutely a new principle, Mr Welling! It is the most wonderful thing the most wonderful innovation I've seen in all my years of manufacturing."

A pleased little laugh seemed to hail from Mr Welling.

"Nothing but the present tightness of money ever suggested selling the thing outright, Mr. Risland," he submitted. "I asked you to look it over because—"

The rest was lost to Robert Mace. In ten seconds he fancied he had gleaned the whole story, and he walked on tiptoe to the butler, staring at him through the gloom.

"I've got one more job for you!" he stated. "Do it, and do it right, and I'll forget that State's prison affair in the hall down-stairs last night. Do you consent to obey me?"

The butler nodded silent assent and gulped

"Go in there and, keeping a perfectly blank expression on your face, without suggesting in any way who is here, say to Welling that a gentleman desires to see him for just five minutes on business of the most urgent nature! Can you do that? Say that I'm in the drawing room."

"I can do it, sir!" the butler said thickly.

A last glance at the formidable gun and he hurried out and to the hall; Mace, listening, caught his low tone in the next room — heard Welling's annoyed voice and then heard a chair move. Mr. Mace, on tiptoe, moved to the drawing room and stood with the revolver behind him, trembling with something that was a long way from nervousness.

And now steps were coming to the door - and through it — and Mr. John Welling, looking about, just caught the startled shout as it was about to leave his lips. Mouth open, his hands went up as if to fend off Robert Mace, for that gentleman was almost upon him and already speaking in a vicious undertone:

"You thought I was out of the way, eh? You thought Miss March was out of the way, did you? You were wrong, Welling, weren't you? I'm right back here on the job and—*I've got you!*"

The other's lips moved without a sound

"I've got you so good and plenty that I'll do all the talking, and you'll stand there and gurgle!" snarled the inventor of the rotary. "There are just one or two little things I want to tell you first, and then I'll tell you what you're going to do! Welling, I think you're the dirtiest, most contemptible scoundrel that ever drew breath! But there were several things about that yacht you didn't know! I've got a case against you for shipping me on that boat that'll land you in the jail that has waited too long, and I've got the United States government to back me up in it!"

"What?"

"That yacht's packed with secret service men by this time, and they tell me they give pretty reliable evidence!" said Mace, and paused for a moment's

enjoyment of the ghastly face before him. "And I have Miss March safely tucked away and ready to tell quite all about the way you tried to steal our little rotary engine, too. That can be made to cost you every penny you own You're following me, are you?"

The wide eyes merely stared at him.

"Now I'll tell you what you're going to do! You've got Risland in that library and you're trying to sell him my engine. Is that the truth or not?" And then, as no words came, the mighty pistol flashed into view and: "You talk, damn you!" snarled Mace.

"It is the truth!" gasped the promoter.

"Good! I don't know what you've done or what you've said. But you're going to take me in there and introduce me as the inventor! You're going to explain to Risland that you were acting for me—you'll have to work out that part yourself and make it sound like truth! But you're going to do that and then get out of New York for good inside of forty-eight hours—"

A certain degree of control was returning to Welling.

"Mace, you're talking wild nonsense—" he began quietly.

And something inside of Robert Mace seemed to snap!

"Or else, by God, I'll shoot you down here and now and take whatever's coming!" he hissed into the other's face. "Are you going to do it or not?"

Second after second they faced each other; shining little beads appeared on Welling's forehead, pure fear distorted the hard face.

"I—yes!" he choked. "I—put that thing away, Mace. I—give me a minute or two to to get hold of myself, and I—will!"

There are but two more episodes for consideration. The first concerns Henry Darling.

When the door of the workshop slammed, Henry Darling looked up with the blank eyes of a man already dead. There were furrows on his sober, youthful countenance and deep blue circles under his eyes, and he raised the drawing-pen with an exhausted croak of:

"Bob! She's almost done now! Almost done!"

On the good side of Robert Mace's countenance the pinched effect suggested recent stress, and much of it; and springy though his step might be, the keen observer might have deduced that Mr. Mace was suffering reaction that neared collapse. Yet the solemn eyes of Henry Darling saw only the bad side of the face, where the blue spots were, saw the torn coat and the collarless neck and all the rest, and the last spark of vitality in Henry Darling flared up as indignation.

Shaking, he tottered to his feet. A lean, ink-smeared finger waved at Robert Mace, and his partner choked:

"By the Lord! This is the end! R-Robert, this is the end!"

"What?"

"It's the end!" thundered Henry Darling. "It's where we part! I've been here working until every drop of blood in my body has turned to water, while you—*you*—"

Mr. Mace considered him with the smile one saves for a wayward and well-loved child

"Henry," he said gently, "you're crazy, but I guess it isn't your fault Go sit down on that cot, old man. I haven't been on a riot of dissipation."

"Your—face—" said Henry Darling weakly as he crumpled to the blanket

"I know it! It isn't the same face by any means, Hen," the lately dapper partner said ruefully. "Don't look at that drawing-board; your job's done. *Here!*"

He poked a yellow handful at Henry Darling, and the latter merely took it and stared, with:

"What's this?"

"It's money, Henry! It's five thousand dollars in real money!" sighed Mace, and he sank into the armchair and looked for his pipe. "It's half of ten thousand dollars paid down on the contract I signed, selling the engine. I couldn't resist having Risland go with me and have it cashed, just for the feel of the stuff!"

Henry Darling was resting on one elbow.

"Risland?" he echoed.

"He bought it—for a million dollars!" Mace said throatily.

A queer little sound came from Darling's direction, half laugh, half exhausted sob.

"Risland—bought it!" he said profoundly.

It was rather still for a time in the little loft. Robert Mace, having located his corncob abomination, had filled it; he smoked fast, too—not with the relaxed air of a man who has accomplished great things, but with the speed of a man who meditates them.

"Henry!" said Mr. Mace

"Uh?" said Mr. Darling.

"I've done a big day's work. You're too tired to hear about it to-night, and I'm too tangled and excited yet to get it all straight. But there's another thing of a damned sight more importance on my mind just now."

"Uh?" queried his partner.

"It's just this, Henry: Is there any law to prevent a man asking a girl to marry him because he's only known her two days? Wait a minute before you shoot off any of those sober opinions!" said Mace, regarding the ceiling through a malodorous fog. "This is a—a special case, I guess. Circumstances—damnable circumstances! have put this girl out of the only place she calls home just now, and—I swear to goodness, I think she likes me a little bit, even now!" The erstwhile self confident inventor blushed self-consciously and neglected to face his partner. "And this thing will have been wound up inside of thirty days and I'll be worth half a million dollars and—Henry! You don't know what I'm talking about, because you're mentally incapable of such things I've heard of men falling in love like this, but I never believed it! Henry, of all the women ever born on earth, this is the one perfect girl!" Mr. Mace shouted. "And—by gad! I'm going to ask her to marry me—to-morrow morning, next week, any time short of that thirty days and the price of a real around-the-world honeymoon!—before she has a chance to think it over! Am I right, Hen?" demanded the man in the chair, whirling upon his partner.

Over on the cot, quite artistically revealed by the half-drawn curtain, Henry Darling slumbered deeply, sweetly; over him a sheaf of hundred-dollar bills had spread like the leaves on the babes in the wood. Thus do some men evince their interest in the love affairs of their best friends!

"Well, I'm damned!" Robert Mace muttered amazedly as he took to gathering up the bank-notes.

The other episode concerns Robert Mace alone.

When he had ascertained that the Miss March, at present a guest, was at home —when the little maid with the big white apron had shown him into the pretty flat parlor and left him perched on the very rim of a chair, Robert Mace realized many things, and all at once

The fool tailor who had opened his shop to fix his coat, under pressure of a ten-dollar bill, had done a perfect spite job! The collar Mr. Mace had purchased was two sizes too small for the shirt which he had also purchased and which seemed to have been designed for some one else. Also, the new tie was a flaming pink, where he had fancied it a sedate maroon; in addition to which his countenance was swelled now in good earnest. The bad side felt not smaller than a bushel-basket and both sides burned, and this surge of perspiration—in a really cool room—was adding nothing to his attractiveness.

The worst feature of most apartments is that one hears too much. Mr. Mace, listening to the clink of dishes, understood suddenly that he had called at dinner-time, whereas he himself had forgotten the existence of food. And as he dabbed at the perspiration further sounds came to him, for a deep, penetrating voice remarked audibly:

"Ask him in here, Dot! I never yet dined with a real, eighteen-carat hero, and "

Somebody closed a door. Mr. Mace gasped quietly, just for the sake, it seemed, of enjoying a quiet gasp. There was a long pause. Nearer at hand, but still distant, he caught a small rustle, and ever so faintly his ears recognized the one voice that he would know among all the voices in the world:

"— the most perfectly wonderful man that ever lived, Hilda! He thrashed—"

Now there was no reason for assuming that the words referred to himself; yet Robert Mace assumed it and rose for precipitate flight through the friendly little hall door—and then stopped and stood erect, as befitted a brave man.

After all, this was his day of days—this was the day when luck had linked

arms with him and stuck close to his side. He might live for a hundred years and never encounter quite such a day again.

He stood even more erect and ran a finger around the unspeakable collar; it was his big day, and even at this biggest moment of it he declined to flinch. He cleared his throat and clenched his hands together behind his back; he smiled, the staid, kindly, conventional smile of a hopeless imbecile!

Quick, light steps were coming toward him, up the hall!

(The End.)

MY LAST TRIP HOME.

(A True Story.)

WHEN the coal-miners in Percy, Illinois, struck in the winter of 1898, I joined them, and as the period of idleness promised to be protracted, I decided to visit my mother in Texarkana. Through my card in the United Mine Workers of America, I persuaded the shacks on the Missouri, Oklahoma and Gulf Railroad to permit me to ride as far as Carie.

Here I found that in order to continue my journey I would be obliged to cross the Mississippi. As the ferries had stopped running for the day, I had resolved that I would spend the night in the railroad yards, when I met a party of hoboes. They advised me to go to the police station, tell them that I was stranded, and in this manner secure a pass across the river.

On reaching the station I was mistaken for one of a group of men and women who had been arrested in a gambling raid. They held me overnight, but I was released in the morning because of the letters and other means of identification in my pockets. During the rest of my homeward journey I rode in a box car with a burly negro, who was finally ejected at the point of a revolver by an enraged brakeman.

After a pleasant stay with my mother, I started on the return to Percy. She pressed me to accept at least enough money to pay my fare, but I was insistent in my refusal, and after a touching farewell, I was off.

On the road I fell in with a jovial young chap named Williams. He had quite a large sum of money, and was almost prodigal in his generosity, offering to see me safely into Percy and to pay my expenses until I found employment, if the strike had not been settled.

When we reached Centertown, Missouri, we left the freight because we had grown cold while riding on top, and asked the operator in the station to shelter us for a spell. He was very amiable, offering no objection, but joining us in several games of checkers, a game he played very skillfully. We slept in the waiting-room, and shortly before morning we were aroused by the day operator, who told us that a train would soon arrive.

Williams sauntered out onto the platform, remarking that he would be back soon, but when he did not return I followed. He was not in sight, and presuming that he had walked up the track, I hurried after him. A farmer was coming down the track when I started, and as he came up to me I noticed that he seemed to be greatly excited.

"What is the matter?" I asked as he drew near.

For a moment he could not speak.

"Have you seen the dead man up the line?" he finally stammered.

Without a word I broke into a run, and though I had sensed it almost intangibly, my worst fears were confirmed. Williams hung dead, his body bent over one of the lower rails of the fence that skirted the right-of-way. I realized almost instantly who had killed him, for I noticed that two of the hoboes on our train had eyed him maliciously as he spoke to me of the money he had with him.

Though I had known him but a short time, I could not suppress deep regret at the young fellow's unseasonable and hideous fate. When I had mastered my feelings, I returned to the station and told the operator. The coroner was notified, and to my overwhelming despair he held me for the crime.

My only hope lay in the story of the night operator, and this was slight, for he had known me but a few hours. I dared not think of the consequences of unfavorable testimony. At my request an officer was hurried to his house, where he was roused from slumber, but consented readily to assist in the investigation. His story and that of the day operator completely exonerated me.

On the Editorial Carpet

If You Have a Grievance We Have Space Here in Which You Can Air It.

THE addition to our editorial policy and the enlargement of THE RAILROAD AND CURRENT MECHANICS to 224 pages makes this magazine not only the largest of its kind in the world, but has broadened its scope sufficiently to include everything interesting and important under the sun in mechanics and inventions.

We feel that the magazine is sufficiently comprehensive now to make a direct appeal to any reader. The fascinating railroad stories, the illustrated special articles, the complete book in every number, and the long string of current mechanics which are gathered from every possible corner of the world give this magazine a variety of which no other can boast.

As always, we are largely guided by the letters we receive from our readers; what they want we try to give them. We spare no trouble or expense to secure any feature that our readers feel they must have. We go to endless trouble to secure the correct answers to their questions, and in this respect we assure our readers a service unknown to any other publication.

WHEN one takes into consideration the tremendous variety of subjects that can be crowded into "Current Mechanics," it is not difficult to comprehend why such a department is not only interesting, but of infinite value. One of our particular aims in starting this department was to describe every new piece of machinery that is brought into use as intimately and fully as possible in a way that will be easily understood by every one.

It has been a great source of satisfaction to us that women as well as men take such a keen interest in mechanical matters. What can be more interesting than knowing the why and wherefore and scientific principle of the great mechanisms that have made the world so wonderful?

When reduced to the A B C of understanding this is the most fascinating reading in the world.

FOR instance, in the November number we will describe the motive power of a heavy gasoline motor-car; that is, we will tell just how it works. We will also describe the marvelous instruments used in the psychological laboratory at Columbia University for testing the acuteness of the human mind and senses—perhaps the most interesting, unusual and remarkable study in the world.

Professors of psychology to-day insist that their department of knowledge is based on genuine science; that instead of being theorized about by people who guess and speculate, the subject-matter has become the object of experimentation. In this interesting Columbia University laboratory the human senses and human mind are "put through their paces" to see how they really work.

Another interesting article describes what is known as the wireless inductive system of railroad telephoning, telegraphing, and signaling recently shown in Birmingham, England.

Among the other interesting matters scheduled are descriptions and photographs of an engine that runs on two gages, a collapsible locomotive, and the boilers of the most powerful locomotive in the world.

The story of steam told from the test of Watt's discovery in a series of moving-pictures, and at least fifty new and interesting matters pertaining to popular electrical mechanics and the latest and most useful inventions recorded at Washington. "How the Gyroscope Is Used to Steady Ships" is another popular subject.

EVERY boy likes to hang around when things are going on and see how the man in charge runs the job. Every boy with a mechanical bent, and interested in doing things, should read the true illustrated story in the next issue, "How I Put Up a 180-Foot Wireless Telegraph Mast," by an electrical engineer. Every father who wants his boy to be a first-class mechanic or a clear-thinking businessman should see that the boy has a chance to read this story.

Then there will be a story of the largest weighing-machine in the world —a machine especially constructed to tell the exact weight of the loads carried by heavy freight trains. What is the weight of a train half a mile long, loaded with granite? Just out of curiosity, would you care to know?

NOVEMBER will be a particularly big number; bigger than anything we have yet put out. You will want it badly for the autumn evenings when the days begin to get short

The book-length novel will be a hummer. It is entitled "The Taxicab Mystery," by E. W. Colley; a detective story which tells how a great New York bank robbery was unearthed.

THE RAILROAD SITUATION IN ALASKA.

RAILROAD affairs in Alaska are in a stagnant condition. Not one of the roads is adding a mile to its existing right-of-way nor, according to authorities, is there a prospect of their so doing. Freightage is falling off, and there is a steady decline in the passenger traffic. There is no likelihood of a change in the situation under present conditions. As a consequence, Alaska is a good place for the working railroad man to stay away from.

While there are several causes that contribute to this state of affairs, notably the overexploitation of the Territory and its resources during the past few years, there are not wanting those who aver that the strictly enforced conservation policy of the government is largely responsible.

Capital, in view of the uncertainty of the future, prefers to keep away from Alaska, and the small settler sees no inducement for making his home there.

Meantime, the government may take a hand in bringing about an improvement in affairs. Franklin K. Lane, Secretary of the Interior, who is on an inspection tour that will probably include Alaska, is urging Washington to acquire the existing railroads and build one that shall run from the coal-fields to the seaboard. Such a line would cover about nine hundred miles of territory and would be introductory to other government railroads that would open up the immense resources of the Territory as a whole.

Mr. Lane has put himself on record as declaring that if Congress will appropriate the money for the coal-field road, a colonization movement to Alaska would ensue that would far exceed the "rushes" for government land that have taken place in other portions of the West. He also avers that the agricultural possibilities of the territory are boundless, and that it only needs railroads to remove them from the domain of undevelopment to that of fact. He avers that there are 65,000,000 acres of land where the grass grows waist-high in the summer and which would readily produce harvests instead of grass.

The owners of the Alaskan railroads reluctantly admit that it would be a good thing for such roads and for the Territory if Mr. Lane's suggestions were adopted by Congress.

TACKLING FREAK TRUNKS.

THE baggageman has at last come into his own, and he is properly rejoicing over his good fortune. The Interstate Commerce

Commission, that far-off body whose sole duty it seemed to many was the fixing of freight rates, has deigned to consider the woes of the baggageman and has issued an order that it is believed will put a stop to the rapidly increasing size of trunks.

Since the man who first invented the wardrobe trunk put his idea on the market the patience of the baggageman has been fast wearing out. Many of these trunks are over six feet long, permitting the fastidious to transport their entire wardrobes without the unpleasantness of having their clothes soiled or rumpled at the end of a journey. While this was a great convenience to the traveler, it soon became an equally great hardship on the baggageman, often resulting in accident or waste of time in handling.

Now, however, the railroads are permitted to charge extra for all trunks over forty-five inches in size. This extra charge is fixed at the proportionate of five pounds for every inch over forty-five. And in addition railroads may, on one year's notice, refuse to accept any baggage over six feet in any dimension.

SILLY "INVENTORS."

EDITOR, THE RAILROAD & CURRENT MECHANICS:

FOR some time past there has been a considerable amount of talk about new devices and the self-styled "inventors" who are responsible for their exploitation. The field of "invention" seems to appeal to the immature and the aged alike. Enthusiastic boys and addle-pated old men dream of vast wealth and great fame and glory—all to be obtained by the acceptance of some gewgaw upon which they have lavished what little brains they have! These misguided "inventors" fail to realize that the worth-while achievements of modern times have been due, in all cases, to *practical workers* and *not* to dreamers!

While unable to produce results of any benefit to mankind, these conceited dreamers have managed to do a great deal of mischief. By a system of crafty "free advertising" they have often succeeded in hoodwinking the public and bringing odium upon those who decline to be their dupes.

Among the chief sufferers from such tactics are the railroads. Men who never saw a lay's service on a railroad, or in any technical occupation, come forward with the coolest effrontery and presume to tell practical railroaders what they ought to do!

Of course, this is an old story; but conditions have reached an acute stage lately, and it is about time to call a halt. The impractical theorists have been encouraged by the officious and inquisitorial attitude of politicians and fakers who, "clothed with a little brief authority," are extravagantly fond of insulting substantial citizens.

Nearly a quarter of a century ago it was predicted that within a few years the steam locomotive would go to the scrap-heap, and that every mile of railroad would be operated by electricity. What an impudent fake this turned out to be is a matter of common knowledge among practical observers. The roads are still spending millions for new steam locomotives and doing little to increase electric mileage. In spite of this, some newspapers print glowing accounts of imaginary electrification projects and magnify the few that are likely to be undertaken.

The whole business of invention has been overdone. Not one device in a hundred is worth anything. In any event, the self-styled "inventor" is not a welcome visitor at railroad offices, nor can he hope to impress men who have forgotten more than he will ever know.

In conclusion, permit me to say that one of the worst factors in the situation to-day is newspaper interference. You have justly said, "Can the Agitators." It is now time to say "Can the Meddler and Interloper"—A. C., New York City.

CONCERNING J. B. KING.

EDITOR, THE RAILROAD & CURRENT MECHANICS:

AFTER reading the letter in your August number signed "J. B. King, Palestine, Texas," I have come to the conclusion that he is mixed up in his dates. He claims that he originated the famous signature in 1896. In 1893 I was a call-boy for the I. C. R. R. at Mounds, Illinois. One day, while going through the yards, I saw the signature on the side of a box car. I was so impressed with it that I got a piece of chalk and practised writing it so much that I almost forgot to call my crews on several occasions. I am of the opinion that the original J. B. King was breaking ahead on the first train out of the ark.—J. T. W., Memphis, Tennessee.

I am not a railroad man, but have read your magazine for years and would not miss a copy.

I have taken a great interest in the discussion about J. B. King. Twenty-five years ago, when I was a boy, I lived in a small town in Oregon on the S. P. line. I remember very distinctly J. B. King being written on box cars then; in fact, I have written it many times myself, being taught by one of the freight conductors. No one knew at that time who he was. The general impression was that it was only a fancy signature. I notice in your August issue that a J. B. King claims that he wrote his name in 1896. He is not the original, for I knew the signature as far back as 1888.—Dr. C. R. H., Los Angeles, California.

THE FIRST ONES.

EDITOR, THE RAILROAD & CURRENT MECHANICS:

IN answer to your questions in the August number I have obtained the following information:

The first railroad tickets were sold July 5,

1830, by the Baltimore and Ohio Railroad The first station was in Pratt Street, Baltimore, the station known as the Relay House, where horses were changed. At the same time, presumably, at these stations there were ticket agents.

On July 27, 1825, a combination "goods" and excursion train was run on the Stockton and Darlington Railway. It was the first excursion train, and the S. and D. was the first railroad to carry passengers. George Stephenson was the "driver," and a man on horseback preceded the train to warn trespassers. The following month a daily service was begun.—S. W. P., Warwick, New York.

NO POST-CARDS HERE.

EDITOR, THE RAILROAD & CURRENT MECHANICS:

I HAVE seen your advertisement, "Send along your good ideas." Mine is not a mechanical idea, and I don't know how good it is, but I was at Laggan a few days ago and could not get a good picture post-card of the place anywhere. In Switzerland especially, and other European countries picture post-cards can be bought for about two cents each. I should think some company should be able to make money out of it. It is not only in the Rockies that there seems to be no picture post-cards, but also in other Canadian places.—H. T. C., Notre Dame, Saskatchewan, Canada.

WHY DO RAILS CREEP?

EDITOR, THE RAILROAD & CURRENT MECHANICS:

AFTER reading the article on creeping rails in your August number I am reminded of an unusual case which has caused much speculation and has been the means of bringing forth many theories as to the real cause, but as many theories were advanced for the cause of the creeping rails in this case, it is fair to assume that none are correct.

At Prairie du Chien, Wisconsin, the C., M. and St. P. Railway crosses the Mississippi River to North McGregor. The bridge is what is known as a pile bridge, and for the most part, excepting a short curve at the west side, it is on tangent or straight and level. The top of the rail is about twenty-three feet above zero on the government gage, and it extends nearly east and west.

There is a pontoon bridge about three hundred feet long in the east channel of this pile bridge over which the creeping occurs and it crosses an island before reaching the west channel. The bridge was built about twenty years ago, and since that time it has developed that the north rail creeps toward the west and the south rail creeps toward the east.

This creeping amounts to about thirty feet a year. It stops about fifty feet from the shore at the island and the same distance back from the east shore. Trains are carried over by a transfer engine.

I might further state as an aid to any one trying to solve this problem that the east channel is used by boats, that it is quite deep in places and requires long piling. During low water and for most of the year the bridge is twenty-three feet above the water, and in some places the water is from twelve to sixteen feet deep.

I have no other data or information concerning the matter, but would be glad to know if any one can tell just why this happens.—R. H., Milwaukee, Wisconsin.

THE FIRST RAILROAD.

EDITOR, THE RAILROAD & CURRENT MECHANICS:

I AM not a railroad man, but when I read the letter in your August number signed by C. E. B., Bremerton, Washington, in which he says that you are in error regarding the statement in your June number as to where the first railroad was located, I felt that I must take the carpet in your defense—if you need any.

Your statement is correct; C. E. B. is in error.

If you think it is worth while, I will quote at length from "The History of Milton, Massachusetts," by Albert K. Teele, written in 1887, an accepted authority on all matters pertaining to the town. The following is from Chapter XII, page 381:

> "First Things." "*The first railroad in the United States* (underlined in italics) was built by the Granite Railway Company. The enterprise had its origin in the building of Bunker Hill Monument. The granite used in this structure was quarried in Quincy and worked in the sheds of the company situated in Milton. In March, 1826, the Legislature granted to Thomas H. Perkins and others a charter for the construction of a railroad, and one of the reasons for the road set forth in the petition was that it would greatly lessen the cost of the proposed monument by furnishing greater facilities for transporting materials to be used in its construction. . . . The railroad was three and one half miles long, extending from the quarry to the Neponset River; about one-half of it was in Quincy and the rest in Milton. It was commenced in May, 1826, and was opened in October of the same year. The gage was five feet. The rails were pine, a foot deep, covered with an oak plate, and these with flat bars of iron."

At a town meeting held April 3, 1826, it was voted unanimously that the inhabitants of Milton most cordially consent that the Granite Railway Company "should build their railway in the town of Milton, so long as said corporation indemnifies and protects the town against charge, prosecution, or damages caused by said railway's crossing the public highways in said town, and no longer. And said town offers the corporation

its best wishes for the success of the enterprise.

What C. E. B. says regarding a portion of the old road-bed being incorporated in the present road-bed of the Fore River works is entirely wrong, as the branch of the New York, New Haven and Hartford Railroad from Atlantic to Braintree runs for some distance through East Milton over the old bed of the first railway in the United States.—J. F. F., Milton, Massachusetts.

ADDRESSES WANTED.

ANY one knowing the whereabouts of Arthur F. Gardiner, who left his home to go to work on the morning of May 27 and has not been seen or heard of since, will kindly communicate with his wife, MRS. ARTHUR F. GARDINER, 1823 Euterpe Street, New Orleans, Louisiana. He was a newspaper man, and is well known to a great many railroad men.

Information is wanted regarding W. D. Adams. He was employed during March last at Calhoun Falls, South Carolina, doing bridge work for the S. A. L. Railroad. In April he was at Norfolk, Virginia, and spoke of going to San Francisco. Kindly address his father, ABNER ADAMS, Box 27, Belleview, Florida.

Information is wanted regarding Thomas W. Johnston, who used to fire out of Pittsburgh. He is 5 feet 9 inches tall, weighs about 160 pounds. When last heard from he was discharged from Troop F, 15th Cavalry, U. S. A., stationed at Fort Leavenworth, Kansas. Any one knowing his whereabouts will please notify ELMER B. WALRADT, Clifton Springs, New York.

Information is wanted regarding Oscar N. Harkleroad. When last heard from he was in Minneapolis, Minnesota, working in the railroad yards and boarding at the Golden Eagle Hotel. Any information will be thankfully received by his father, J. J. HARKLEROAD, Frederick, Oklahoma.

Information is wanted regarding E. B. Ahearn, who left his home in Pasco, Washington, last February and has not been heard from since. Kindly advise his wife, MRS. E. B. AHEARN, Pasco, Washington.

THE POETS' CORNER.

"COME HOME, FATHER"

"FATHER, dear father, come home with me now!
The clock in the steeple strikes one;
You said you were coming right home from the shop
As soon as your day's work was done.

Our fire has gone out—our house is all dark—
And mother's been watching since tea,
With poor brother Benny so sick in her arms,
And no one to help her but me.

"Father, dear father, come home with me now,
The clock in the steeple strikes two;
The night has grown colder, and Benny is worse
But he has been calling for you.
Indeed, he is worse—ma says he will die,
Perhaps before morning shall dawn;
And this is the message she sent me to bring:
'Come quickly, or he will be gone.'

"Father, dear father, come home with me now,
The clock in the steeple strikes three;
The home is so lonely—the hours are so long
For poor weeping mother and me.
Yes, we are alone—poor Benny is dead,
And gone with the angels of light;
And these were the very last words that he said—
'I want to kiss papa good night.'"

THE CROSS TICKET-AGENT

Contributed by John Hammet, Durban, South Africa.

AS I sat in the station and gazed at the throng,
Among which the weak must give way to the strong,
I noticed that nine out of ten wished to know
"What time does the next tram to such a place go?"
They had not the time to consult the time-table,
Or they would not be bothered—perhaps were not able
The ticket man looked so confoundedly cross
That at first I mistook the young man for the boss.
As a rule you will find that the boss is more affable
Than his young employee, which at times is quite laughable;
But perhaps if the old man were brought under fire,
His smiles would give out and his patience would tire;
For the heart of no man, I will venture, rejoices
When he's shot at all day by a medley of voices.
I thought I would ask him "what time," but I faltered
When I gazed in his face, and my tactics I altered;
With pencil and note-book I wrote—what a sin—it's
Just what this young chap had to hear in three minutes
"What time does the next—?" "Have you got a time-table?"
"How soon does the train—?" "One ticket for Babel!"
"How much is the fare?" "Boss, give me a ticket

As I'm going clean through, in my hat-band I'll stick it."
"Has the train gone for—?" "*Choo! choo! choo! choo! choo! choo!*"
"Run, Betsy, for Heaven's sake!" "What shall I do?"
"I say, Mister, has—?" "One return for Salt Spring!"
"All aboard for Scorackity!" "*Ding-a-ling-ling!*"
"Did you find my umbrella about two weeks ago?"
"I say, Mister ticket man, ain't your clock slow?"
"Say, when's the train due?" "Young man, d'ye mind?"
"This change isn't right!" "Is the train much behind?"
"Young fellow, you're cross!" "The train's coming, I think!"
"No, it's only a freight-train!" "*Clink-clinkety-clink!*"
"How late do the trains?" "How early?" "How fast?"
"What the deuce will we do if that train was the last?"
"Will you give me my change?" "I want to go to—"
"All aboard for—!" "Come, John!" "Laws sakes!" "*Choo! choo! choo! choo!*"

December 8, 1870.

THAT WHISTLE SAVED MY LIFE.

BY RALPH BINGHAM.

"YOUR train is thirty minutes late," the operator said,
"She'll meet our No. 7, sir, down there at 'Nutler's shed.'
Our No. 7—that's the train that just steamed to'rd the west,
With old Jim Carson pullin' her: and, pardner, he's the best
That ever jerked a throttle or tried to sand a track;
And but for him I'd be right now where folks don't oft come back.

"*How'd he come to save my life?*" I'll tell you short and sweet
It's just the way he 'whistles in' that's kept me on my feet
When Jimmie Carson jerks the rod he pulls her down to stay,
And makes her yell 'bout loud enough to hear ten miles away
There ain't no weak-kneed pullin' 'bout how Jim jerks the rod,
And when a 'track-cow' hears his flute she just gulps down her cud

"Now, see that semaphore up there, the light that's burning bright?
One side shows a gleaming red, and the other shows the white;
This handle here, when it's pulled down, shows white and means 'she's clear,'
And when it's up the signal red means 'danger, engineer'
"'Twas but a year or two ago that this was made a stop
For 'fliers' such as Jim pulled and, friend, they had to hop
To make their time and keep the coaches rolling on the rails,
An' make connections at Orleans with all them western mails
The night I spoke of, when I got so awfu' close to heaven,
Jim Carson's train was due past here at 'leven fifty-seven.

"He never stopped unless 'the boss' had orders for him here,
And all I had to do was pull the white and show 'she's clear';
An' I sat there behind the stove a looking at that box—
It's iron—it was full that night of good old golden rocks
'Twas sent here from an Eastern bank. Next day was pay-day, see?
And I was wondering what I'd do if some one tackled me—

"When I was startled by a noise, and, turning toward that door,
Saw standing there a 'muster man' behind a 'forty-four.'
'Up with them quick!' was all he said, and up they went, you bet;
'And next,' said he, 'I want them keys.' My friend, I hear him yet
'The keys,' I said, 'you'll never get as long as I'm alive.'
I noticed that the clock above showed 'leven fifty-five.

"Said he, a speaking slowly, 'I'd hate to bore you through,
But if you don't give up at once that's what I'll have to do;
I'll give you sixty seconds, exactly sixty ticks
Of that old clock above your head, now 'leven fifty-six.'

"I felt my heart a keeping time to each tick of the clock,
A beating there my funeral knell, and every tick a shock.
Thoughts of home and wife and child went flitting through my head,
For I could see the scoundrel, sir, meant every word he said.

"Just as I'd given up all hope, four shrieks, that would have woke
Just anything that ever died, upon the still air broke
The clock showed 'leven fifty-seven. Jim Carson he was there,
A shrieking for the white, sir, and it saved me by a hair

"The scoundrel turned a deathly pale, the gun it hit the floor.
I grabbed it, struck him o'er the head with his big 'forty-four.'
I pulled the rope and showed the white; Jim Carson sailed on through,
That whistle, sir, had saved my life. That's all; your train is due"

Sermons on ideal heating

have been delivered by pastors in gratefulness for the joyous cheer and cleanliness our modern method of warming has brought, as well as the marked effect in increasing the attendance. Everywhere people, in churches, homes, stores, offices, etc., are becoming awakened to the wholesome benefits of genial, sanitary warmth and reliable ventilation produced only by use of

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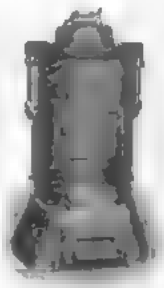
A No. 225-S IDEAL Boiler and 400 sq. ft. of 38-in. AMERICAN Radiators costing when $225, were used to heat this cottage. At this price the goods can be bought of any reputable competent Fitter. This did not include cost of labor, pipe, valves, freight, etc., which are extra, and vary according to climatic and other conditions.

These outfits can be put in without any tearing up, annoyance to occupants or disturbing old heating methods until ready to start fire in the new. If you are ready to quit being a slave of the coal hod and are paying the bills and suffering the ills of old-fashioned heating, phone, call, or write *to-day!*



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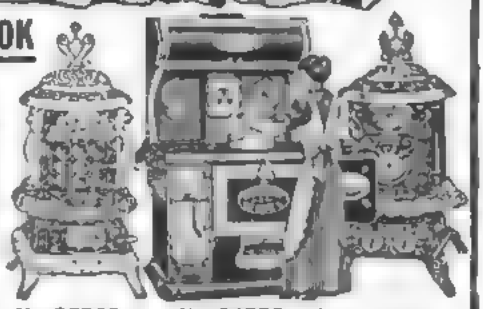

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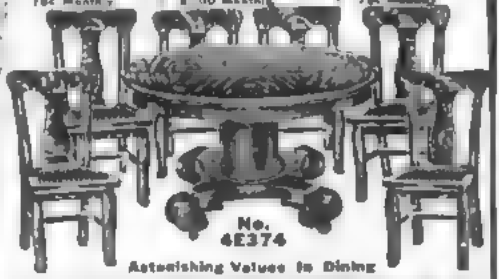

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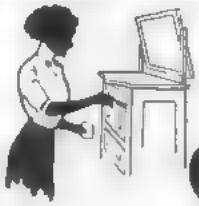

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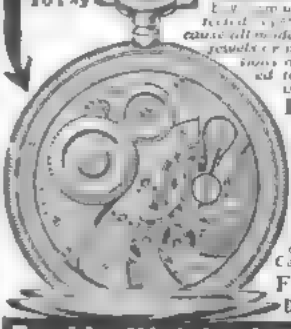

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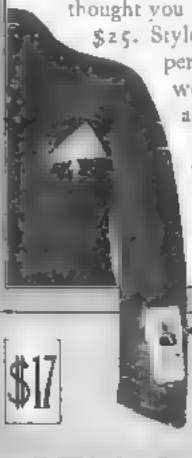

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These superb Billiard and Pocket-Billiard Tables are found in thousands of refined homes throughout the world.

They are billiard tables for rooms of average size on which *real billiards* can be played. Made of finest Mahogany, with classic inlay design, fitted with genuine Vermont Slate Beds covered with [illegible] Billiard Cloth, Monarch Quick Acting Cushions, Concealed Cue Rack and [illegible] entire playing equipment. The [illegible] Baby Grand Billiard Table [illegible] Pocket Billiard Tables [illegible] 3x6 feet.

Brunswick "Convertible" Billiard Tables

These magnificent tables [illegible] available for billiards [illegible] Three styles [illegible] the Brunswick Convertible Billiard Table [illegible] Pocket Billiard Table [illegible] Pocket Billiard Tables [illegible] when not in use for billiards serve as handsome practical pieces of household furniture.

Over A Year To Pay

We sell Brunswick Home Billiard Tables *direct from factory* at very moderate prices and exceptionally easy terms.

Playing Outfit Free

with each table, including cues, balls, cue rack, markers, Book of Rules, "How to Play," etc., etc.

Free Color-Illustrated Book "Billiards—The Home Magnet"

This [illegible] book [illegible] describes and illustrates in actual colors the [illegible] Brunswick Home Billiard and Pocket Billiard Tables. Quotes [illegible] factory prices, gives details of Easy Purchase Plan and [illegible] Write for your copy today. (116

The Brunswick-Balke-Collender Co.
Department H K, 623-633 S. Wabash Avenue, Chicago

Gentlemen:—Please send to the address below, your book

"Billiards the Home Magnet"

Name .....

Address .....

Town ..... *State* .....

GENUINE PERFECT CUT

DIAMONDS $97.50 per Carat

14K Solid Gold Mountings

World's Lowest Importer's Prices

¼ carat Diamonds.....	$ 8.25
½ carat Diamonds.....	17.50
¾ carat Diamonds.....	31.25
¼ carat Diamonds.....	45.00
⅞ carat Diamonds.....	67.50
1 carat Diamonds.....	97.50
1½ carat Diamonds.....	146.25

Add $3.75 for 14K engagement solitaire mounting like ring above. Add $5 for men's belcher ring or scarf pin mounting.

Any Diamond Shipped on Approval!

C. O. D. by Express, Parcel Post or in care of any Bank in your city at our expense and risk without obligating you to buy. You must recognize a saving of one third—see a full $150 per carat size and value at **$97.50 per carat**, or you may order the diamond returned

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The [illegible] scientific discovery of [illegible] scintillating gem. Parisian Gems have the fiery beauty of genuine diamonds will cut glass and retain the brilliancy [illegible] years. Set only in genuine solid gold 14k mountings.

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1 CARAT GEM 14 K. SOLID GOLD LADIES RING $5.00

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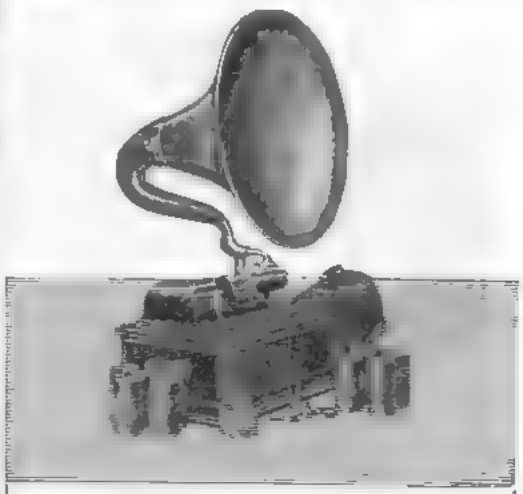
SEE THEM SPARKLE



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Mr Edison's wonderful new instrument—the perfection of the Phonograph—now ready for shipment—on a wonderful sweeping offer DIRECT from us—shipped on

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I want you to see and hear this phonograph, to convince you of its enormous superiority over anything you have ever heard in the line of talking machines. I want your friends and neighbors to hear this superb product of Mr Edison's skill. I will send you your choice of any of the new style instruments you select **without a penny down**—no deposit—no C. O. D., no obligations to buy. Take the instrument to your home—*hear all the latest up-to-date songs, the latest waltzes, two steps, vaudevilles and minstrel shows. Listen to the old fashioned hymns—the peal of the organ, crushing brass bands, orchestral concerts. Entertain your family and your friends with solos, duets, quartettes—the funniest comic sketches and the grandest symphonies. Then when you are through with all this entertainment, you may return the outfit at our expense.*

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[illegible] an important book. Besides listing the new Edison styles, and a complete list of the new wonderful Edison Blue Amberol Records, this book tells you how and where you can use the phonograph to the best advantage; how to use it in the home and at the dance in private and in public. With this catalogue we give you full explanation of our remarkable free trial offer. Send postal or letter [illegible] coupon and the catalogue will be sent [illegible] tion in getting the catalogue. Be the first in your town to get this new Edison, so write for the catalogue today

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Please send me, without any obligation, your New Edison Phonograph Catalogue list of Amberol Records and free [illegible] grand offer all free.

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Address .....

The Railroad and Current Mechanics Agents' Bureau

A Department of Opportunity Where the Manufacturer Meets the Men Who Sell His Goods

ADDRESS ALL INQUIRIES FOR RATES AND ENROLLMENTS TO THIS MAGAZINE 175 FIFTH AVE., NEW YORK

A Little Talk to Agents

WE are swinging into the big fall selling season with a list of agents' propositions hard to beat.

No matter what an ambitious man or woman wants to sell, there is diversity enough in the offerings in this department to meet any line of salesmanship you want to follow.

In order to appreciate just what these advertisements mean to ***you,*** you should investigate the real sales-plans that form the foundation of this advertising.

One advertiser, for instance, has a savings plan by which his representatives are credited with a generous percentage on their aggregate sales over and above their usual commissions.

Another advertiser has a carefully worked out plan by which the agent profits on every "repeat" order, whether he sends it in or it comes in direct. This broad-visioned manner of dealing with agents means the establishment of an estate which continues to pay interest on the original labor expended in its behalf long after the first sales have been made.

We mention this to show our readers that the selling of the specialties advertised in these pages is not a hit-or-miss pastime, but is a business organized on sound economic principles, capable of paying big profits, making big futures for men and women who follow it conscientiously.

COUPON

..... 1913.

THE FRANK A. MUNSEY COMPANY,
175 Fifth Avenue, New York

I desire to be enrolled as a member of
The Railroad and Current Mechanics Agents' Bureau
with the understanding that this costs me absolutely nothing in dues, fees or any charges whatsoever.

I am interested in .....

Name .....

Street .....

City and State .....

Above note kind of goods you think you can sell.

Clean-Easy-Dustless-Sweeping

Easy to Use **KLEAN SWEEP** SANITARY Sweeps Clean No Dust **FIBRE BROOM**

Sweeping a pleasure. Dirt and dust with Broom. Handle. Sanitary. Durable. Cleans carpets, rugs, matting, oilcloth, linoleum, hardwood floors, etc. Can be used as a sprinkler. Send back if not satisfactory. Big Money for Agents. Send 25c. for Agent's Sample. Postage paid.

AGENTS WANTED

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MR. AGENT: To appreciate the

Novitas Watch Pocket Lighter

You MUST send for SAMPLE. Sells on sight. Sample postpaid 25c. No waste. Always ready. Perfect. "ZIPP—IT LIGHTS"

New catalog and wholesale agents prices on request. Agents Wanted Everywhere.

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Mostly sold by recommendation. For Personal Desk or General Office.

It checks mental calculations. Handsome Morocco case free. Buy Thru Your Stationer. Write for 10 day trial offer.

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Golden Gem Adding Machine $10

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LINENS
COTTONS
WORSTEDS

From the Mills To the Millions

BUY DIRECT from us or our representative. Big profits; easy to sell. Write for catalog and full particulars. Mention what you want to sell.

AGENTS WANTED. Part or all time. Big money. Exclusive territory. Write for terms. Mention what you want to sell. Make $1,200 to $2,000 a year. Write for Agent's Plan.

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CLIMAX SMOKELESS ODORLESS FRY PAN

Cooks all food juicy and tender, browns beautifully, no odors to attract flies or destroy the appetite of the one who prepares the meals. No steam condensing on portières, furniture or anything to breed germs, saves the price of itself many times over. Size, diameter 11 in. Prepaid $1.50. AGENTS WANTED.

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We Pay $10 to $50 A Week For Your Spare Time

Successful men have made their start in life by doing something worthwhile in their spare time. We have a plan to utilize some of your spare moments. You will be generously paid for the time you devote to our proposition. You do not need any capital, but can easily build up in a short time a business of your own. Write at once for our plan.

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We want to send it to hustlers, who have the salesman's instinct and can see a profitable business ahead in selling our popular line of

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Direct to Wearer

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Write today for [illegible]

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Clean your floors easily, quickly and thoroughly while standing and without putting your hands in the water. Works like a clothes wringer. A turn of the wrist and you bring the cloth, the scrub-brush or the scraper into instant use

FOUR-IN-ONE SELF-WRINGING MOP

$1.50 COMPLETE

yields a grand return on the investment of $3.50

A money maker for Agents

Sample $1.50 prepaid

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CLARK & DUPRE MANUFACTURING CO.

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4 in 1

How FESLER Agents Build Up an Equity For Themselves

THIS is the FESLER FOUNTAIN SHAVING BRUSH, and its distribution offers the best and most equitable agents' plan ever perfected. The agent who sells this brush not only makes an immediate and generous profit, but he begins at once the creation of an estate—an equity—that in five years runs into *five figures!*

Your Action In This Matter Should Be Immediate.

[illegible]

If you want to try a brush, one will be sent prepaid on receipt of $1.00.

FESLER SALES COMPANY

254 West Twenty-third Street, • • New York

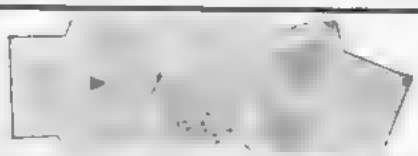
Perfection Sanitary Apron

No woman's wardrobe complete without [illegible]

Sent postpaid for 50 cents.

LADY AGENTS [illegible]

THE HOLLEY CO. Dept 163, Rochester, N Y



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[illegible] Shirt [illegible] Waist [illegible] Suit Materials Handkerchiefs, etc. [illegible] Territory [illegible] Samples FREE

MITCHELL & CHURCH CO., 238 Water St., Binghamton, N. Y.

A Little Talk to Agents

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The Cavalier

175 FIFTH AVENUE, NEW YORK

LEWY DIAMONDS

12% PER YEAR INCREASED DIAMOND VALUES GUARANTEED

LEWY DIAMONDS

Lewy Bros. Co. give every customer the benefit of the rise in diamond values! Diamonds have gone up 12% yearly for over 20 years! This increase Lewy Bros. Co *guarantee to you*, and allow you 12% per year (1% per month) *MORE THAN YOU PAID*, in exchange *at any time!* Our diamond Guarantee is a written contract, certifying the carat weight, color, perfection and value of every diamond.

LEWY BROS. CO. founded in 1895, occupy one of the [illegible] from the State Street corner in Chicago. [illegible] We refer to the Corn Exchange National Bank, one of the leading banks of America. Capital $5,000,000.00.

$48.50

Violet-Blue Diamond Solitaire

[illegible] and [illegible] on approval [illegible] Pick [illegible] Write [illegible] Mounting [illegible] Don't [illegible] Per year [illegible] per month [illegible] guaranteed [illegible] at any time [illegible] owe only $5.00 [illegible] $48.50

C O D on approval no deposit or obligation.

We are glad to send you any diamond, permit you to examine it in any bank or express office [illegible] without obligation to purchase entirely at our [illegible] We are ready to show you a clear saving of 15 per cent below the retail price of jewelers.

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Look and Wear Like Diamonds

A Marvelous Synthetic Gem

Not Imitation

—the greatest triumph of the electric furnace. ***Will cut glass***—stands filing, fire and acid tests. [illegible] Mountings guaranteed to [illegible] cutting glass. [illegible] or backing—their brilliancy is guaranteed forever. Only [illegible] the cost of a [illegible] These [illegible] that [illegible] gems are set only in 14 Karat Solid Gold Mountings.

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—your money cheerfully refunded if not perfectly satisfactory. Write for our [illegible] De Luxe Jewel Book [illegible] yours for the asking. Address

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Build Your Own POWER SPEEDER

[illegible] shows you can attach [illegible] Flexible [illegible] [illegible] [illegible]

Less Than Half and More than 1/2 Saved
On Unredeemed Pledges
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Examine If Satisfied, Pay—If Not, Return.
We Ship, Privilege of Examination

[illegible] saving a diamond or other [illegible] by sending [illegible] our safe, sure plan in our prices under [illegible] mail order [illegible] with ours.

Our Big Bargain Bulletin [illegible] shows how [illegible] Having [illegible] for [illegible] years we [illegible] more [illegible] money, with [illegible] our investment [illegible] necessity for disposing of which [illegible] low prices. Send for free copy of [illegible]

Worthwhile Christmas Gifts
On Which We Accept A Deposit For Later Delivery.

No. 345969. [illegible] kt guaranteed genuine perfect cut [illegible] white [illegible] Try to match it at $85. With Guaranteed Loan [illegible] *Our Lowest Price* based [illegible] **$128.35**

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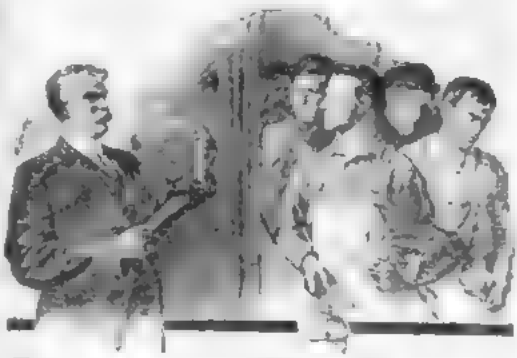

Picking the New Foreman

How many times, on your way home from work, have your thoughts been something like this: if I only had the boss's job and his pay, I could have a little home of my own with everything in it I wanted. I could afford to dress the wife and children better—and there would be no skimping at the end of the month for fear the money wouldn't last until next pay-day. I could have a new suit now and then, and, best of all, could lay up a little money so that when I've reached the age limit" I won't have to beg for a job at any old salary just to keep body and soul together.

If you haven't thought along these lines, it's time you did. If you don't plan for yourself no one else will, and soon you'll reach the age when it will be impossible to take advantage of the opportunity the *American School* offers you today.

Just think of it—here's a School that offers to raise your salary—practically guarantees it if you follow their instructions—and this School has been in the business of helping men who never had a chance, for fifteen years. They have helped thousands all over the world to big jobs and big salaries.

Just fill in and mail the coupon. In checking the position you want, it is better to select one in which you have had some experience. Then we'll send you complete information regarding the work you want to do. We'll tell you just how to go about it to become a trained man and get a better job. You don't have to take a chance. If you don't like our methods after the first lesson, just say so and all you will have to pay is the cost of the books we have already sent you—the balance will be cancelled.

And remember, we do not send agents or collectors to bother you in your home or at your work. We do all business exactly as we teach by correspondence. Whether you earn more money [illegible] whether you have a bank [illegible] I am [illegible] I never had a chance [illegible] cannot [illegible] American School is offering you your opportunity today. Will you sign and send in the coupon?

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Architect	Accountant
Building Contractor	Cost Accountant
Architectural Draftsman	Civil Service
Structural Engineer	Auditor
Structural Draftsman	Business Manager
Concrete Engineer	Fire Ins. Inspector
Civil Engineer	Fire Ins. Adjuster
Surveyor	Fire Ins. Expert
Mechanical Engineer	Wages Figure Clerk
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Plain Truths of Sex Life every person needs to know. Safety in marriage relation, strong manhood & womanhood, healthy and robust children, prevention of sexual abuses, "sports even" unnatural senses, causing the innocent to suffer blindness, nerve disorders, and other insanity and death, sex education for sex problems, Symposium on the "Use of Cigarettes" as against sexual vices, Miss Jane Addams on "Commercialized Vice," Mrs. Carrie Chapman Catt on "Votes for Women Abroad," Mrs. Alice Stebbins Wells on "Work of Women Police," segregation, social evil, etc., and the other sex moral problems discussed by the greatest authorities, sexual ignorance the chief cause of the awful slave traffic, teaching sexual truths boys and girls need to know; physiology of sexual organs in light of latest researches, **wonderful power of secretions of sex glands;** sexual phenomena recently discovered by scientists, explains "secret of manhood & secret of womanhood," **exposes "fakes"** on debility or "loss of manhood," dispels ignorance that makes victims for "quacks," latest scientific explanation of nocturnal emissions, **secrets of self and sexual strength all should know;** "Sexology" according to latest scientific researches, **By Winfield Scott Hall, Ph.D., M.D., (Leipzig)** Prof. of Physiology, N. W. U. Medical School, Chicago, World-Famous Lecturer and Authority on Sex Problems. Sexual Knowledge for every woman, girl, wife & mother, Sexual Knowledge for every man, boy, husband & father. All in one volume, in plain, simple, inoffensive language.

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You run no risk whatever. You're sure to be **pleased in every way.** We guarantee **to fit you perfectly** and thoroughly satisfy you or you get your money back

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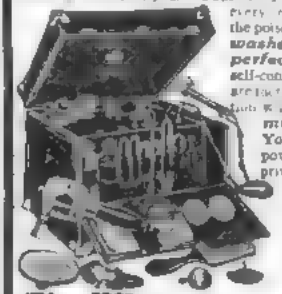

The White Cross Electric Vibrator

is the result of years of work and experiment [illegible] If you have your [illegible] it up as easily as an [illegible] If not, it will run perfectly on its own batteries.

Special Offer for a Limited Time

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Munsey's Magazine

BEGINNING with the June number, MUNSEY'S MAGAZINE, the flag-ship of the Munsey Publishing House, initiated the publication of a complete book-length novel in each issue.

This is an epoch in the making of standard magazines—something distinctly new. It marks the beginning of the end of serial publication in monthly instalments. It means that when the serials now running in MUNSEY'S MAGAZINE are finished, all fiction and all everything will be complete in each number.

The complete novels in MUNSEY'S MAGAZINE will not be mere novelettes, but full-length book stories—stories that would run through six to a dozen numbers if printed in serial form, stories that will sell for $1.25 to $1.50 as books.

This new departure is not altogether an experiment, as we inaugurated the publishing of book-length novels in THE ARGOSY and THE ALL-STORY about a year ago. It is new, however, strictly new, as applied to standard illustrated magazines.

MUNSEY'S MAGAZINE has never been a slave to conventionality. It has never been a trailer. It has blazed many new paths, has done many new things. But at no time has it done a more revolutionary thing than that which it initiated with the June issue, in the publication in full of a long book novel.

The weekly publication is preeminently the medium for serial stories. In it the time between instalments is just about right—not too long, not too short. In the monthly issue, the complete book novel is the logical thing. Serial publication in

Again Blazing a New Path

the monthly, notwithstanding the vogue it has had, is illogical and unsatisfactory. I don't believe the average reader to-day is satisfied to wait an entire month for an instalment of a serial story and then wait another month and another and another, covering, in all, six or eight or a dozen months.

This new move means that MUNSEY'S MAGAZINE will give the reader, during the next twelve months, from fifteen to eighteen dollars' worth of books—one dozen $1.25 to $1.50 books. And all this in addition to the usual contents of the magazine—articles, illustrated and plain, editorials, poems, short stories, and departments. The only change will be the substitution of the complete book novel for the serial story.

New York, June 2, 1913. **FRANK A. MUNSEY.**

The book-length novel to be published complete in the October issue of MUNSEY'S MAGAZINE, on sale September 20th, will be "The Hour of Conflict," by A. Hamilton Gibbs, author of "Cheadle & Son" and other books.

The scene of "The Hour of Conflict" is laid in France and England. It tells the story of a reckless young man who sinned and sorrowed, and who was finally purified by suffering and by love. It is an unusual piece of writing, having a dignity and quality too seldom met with in the strivings of contemporary fictionists. The love story is as sweet as the scent of honeysuckle, and a gentle, heart-warming humor flashes through it all. It is a book which you will want to put away among your literary treasures, for it will bear more than one reading.

This series of complete novels began with "The Flying Courtship," by E. J. Rath, published in the June number of MUNSEY'S MAGAZINE. "The Kangaroo," by Harris Dickson, followed in July, "The Little Nugget," by P. G. Wodehouse, in August, and "The Wasp," by Theodore Goodridge Roberts, in September. The numbers containing these stories are still in stock, and can be ordered from any newsdealer, or from the publishers, price fifteen cents each.

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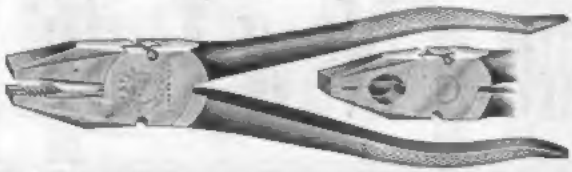

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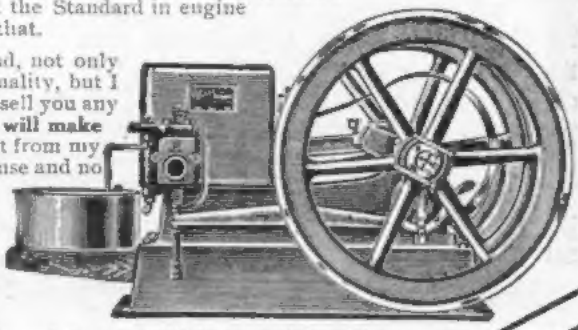

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